

# Chemical W

**NEW CHEMICALS**  
FOR INDUSTRY

◀ **SOVIET SCIENCE  
FOR HIRE. WHAT'S  
AVAILABLE ...p.101**

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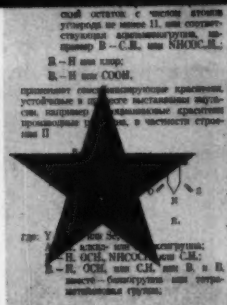
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**ON THE COVER:** Pages from Russian patents—such as the cover specimen—will become a familiar sight in the U.S., as the Iron Curtain nations broaden process offers (p. 101).



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## Opportunity, or a Trap?

WITHIN the past few months, Soviet-bloc nations have made it clear that they would like to grant licenses on some of their chemical processes to the industry of Western nations (*see p. 101*). Russia itself, East Germany, Hungary, Poland and Czechoslovakia are among the countries that have taken steps toward opening—or simplifying—negotiations for licenses. We believe it would be of significant advantage to U.S. companies to probe these possibilities to the fullest—even to sign contracts where warranted.

This, of course, holds important political considerations. It is clear that the main reason the Reds have begun to court our industry and our technologists is for their own gain—for royalties, of course, but more importantly, because their moves might well encourage a know-how swap that would be beneficial to them. They have made it no secret that they need Western help in building toward the industrial capacity that will, in Khrushchev's word, "bury" us.

Moreover, it is striking that a number of the processes they now offer the West are in those areas where they have most assiduously sought help. In the textile fiber field, for example, East Germans now offer processes for the manufacture of polyacrylonitrile, polyamide, polyester, and viscose fibers.

There are two superficial interpretations of this: (1) They are offering their own feeble advances simply as a wedge to pry open the doors of Western laboratories and plants, so that in a process and know-how swap, we would be bested. Or (2), they are honestly using their best technology to earn a look at our technology.

Right now, no one in the West can realistically accept either interpretation. Judgments based only on apparent Soviet political and economic goals—judgments made without a close examination of exactly what they have to "sell" in a particular field of technology—simply are not sound. That is why we urge a thorough, top-level examination of what the Red-bloc nations offer.

The gains in such a course are manifold. To name just four: (1) We would get a close look at processes Iron Curtain countries apparently feel are most commercially feasible, in terms of raw materials, operating equipment, and the like—and pilot operation of such processes might reveal the grade of product they find acceptable. (2) There would be the chance to evaluate their personnel (they offer to provide technical assistance). (3) There is opportunity to improve U.S.-Soviet understanding. (4) There might well be useful, advanced processes to be had.

In any case, there is little to be gained by ignoring this chance to explore some limited segments of Iron Curtain science. As our research story points out, negotiation will likely be slow and complicated. In all probability, a process could not be fully evaluated unless dealings were pretty far advanced. But that is no reason for a head-in-the-sand attitude. Indeed, a precise sounding on Soviet terms is valuable information in itself. And in a fair swap—admittedly a subjective term—U.S. chemical producers should have little to fear. We have not achieved our position of strength in the chemical world by being fearful of what competitors offer.





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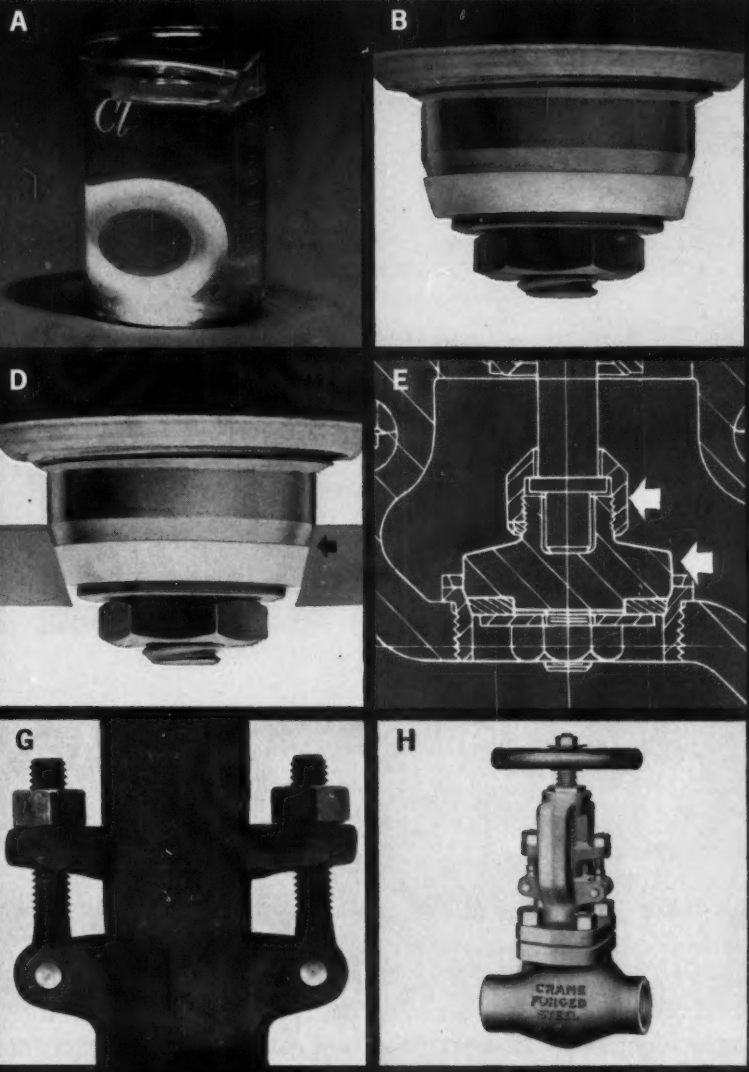
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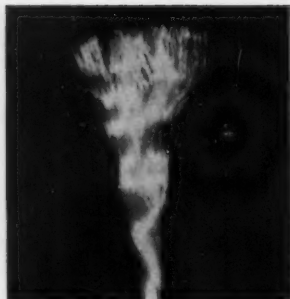
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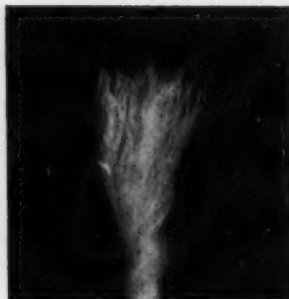
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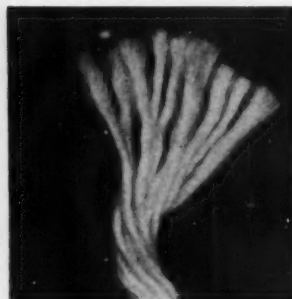
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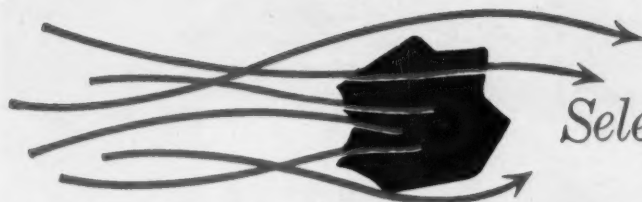
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December 16, 1961 **CHEMICAL WEEK** 15



# Remember when they fed 'em lye

In fact, the practice of feeding lye as a swine wormer may still exist in some places. But it is doubtful that lye is either an effective worm killer or worm purger, and the mortality rate is likely to be greater among the pigs than the worms! Other equally doubtful dewormers that have been tried on humans or animals are betel nut, tobacco leaves, pumpkin seeds, turpentine, even kerosene and gasoline. ¶ Since 1955, the most effective and economical anthelmintic has been piperazine. Piperazine salts are used by more than 75% of the hog raisers who practice any form of worm control, with many reporting 99% effectiveness. Jefferson, as the leading producer of piperazine, is doing much to reduce the estimated \$76 million damage caused by swine worms annually. ¶ For technical information on piperazine and Jefferson's some fifty other hardworking chemicals . . . write Jefferson Chemical Company, 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.



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## JEFFERSON CHEMICALS





# Business Newsletter

CHEMICAL WEEK  
December 16, 1961

**The President's "bold new" trade program is being pushed** on all fronts. Following his personal pitch to management last week at the annual meeting of the National Assn. of Manufacturers in New York, and to organized labor at the AFL-CIO convention in Florida, the Commerce Dept.'s deputy assistant secretary for trade policy, Peter Jones, carried on. In Charlotte, N.C., he urged the Southeastern state's world trade group to help push the program through Congress.

And Undersecretary of the Treasury Henry Fowler, in an after-dinner address to members of the Synthetic Organic Chemical Manufacturers Assn. in New York late last week, also managed to get in a plug for the new trade policy.

**Fowler first spelled out a 10-part program** calling for government and industry cooperation to expand U.S. sales abroad, step up research and development, increase investment in new plant and equipment via depreciation and tax reform, "minimize" unemployment, and cope effectively with the threat of inflation. He underscored the rising Soviet-bloc economic power, and the need for the U.S. to wipe out its balance of payments deficit.

Then, apparently aware of SOCMA's attitude on free trade (*see p. 23*), Fowler essayed a soft-sell approach in asking for industry support for the President's program.

•  
**Merger or acquisition?** The route hasn't been decided yet, but Hunt Foods & Industries has reached tentative agreement on terms for one or the other, with the West Coast's largest paintmaker W. P. Fuller & Co.

Involved will be an exchange of 0.525 shares of Hunt common stock for each share of Fuller common, with Hunt the surviving concern in the merger. About 394,000 Hunt shares, valued at about \$27 million, will be involved in the transaction.

The proposal will be presented to directors of both firms by company representatives who have been discussing the deal, but there's no indication when action might be taken.

•  
**Freeport Sulphur may be in the uranium business** within a couple of months. An earlier report (*CW Business Newsletter, Sept. 16*) that the firm was mulling over acquisition of Uranium Reduction (Salt Lake City), and uranium properties of Utex Exploration, near Moab, Utah, has been confirmed by the three companies. Tentative purchase price: about \$25.8 million in cash.

Although Freeport says it has not as yet made a commitment to



## Business

### Newsletter

(Continued)

buy (but will decide "within sixty days"), chances are the deal is too attractive to pass up.

The company would be acquiring: an \$8.6-million, 1,500-tons/-day uranium processing mill now operating under a contract to sell about 12 million lbs. of uranium oxide to the AEC through Dec. '66; mines and extensive uranium reserves of the Mi-Vida properties near Moab; and a chance to profitably invest some of the \$74 million (after taxes) it received from the sale of its Louisiana oil and gas interests to Magnolia Petroleum in '58.

•  
**Monsanto's decision to build a vinyl acetate monomer plant** at Texas City (*CW Business Newsletter*, Dec. 9) is stirring trade speculation as to the source of needed raw materials for the 45-million-lbs./year unit. The company has said that the acetate will be made from acetylene produced at Texas City, and acetic acid "derived" from ethylene (not acetylene as previously reported).

*CW* learns that the acetic acid will come from Celanese's new acetaldehyde plant now under construction at Bay City, Tex. A contract already signed, reportedly calls for Monsanto to pipeline ethylene from Chocolate Bayou to Bay City, where it will be "converted" to supply about 25 million lbs./year of acetic acid for the vinyl acetate operation. (Celanese is the only U.S. licensee of the new Hoechst-Wacker direct ethylene-oxidation process) (*CW Technology Newsletter*, Feb. 4).

Although the Bay City unit (using ethylene purchased elsewhere) will be in operation by April '62, the Celanese-Monsanto arrangement won't go into effect until the latter's Chocolate Bayou ethylene plant comes in sometime in late '62. (Incidentally, Celanese's related 25-30-million-lbs./year 2-ethyl hexanol plant at the Bay City complex, will be starting up very shortly).

•  
**Increase ahead in capital spending**, says the latest SEC-Commerce Dept. survey out this week—and chemicals again lead the CPI. Report predicts all manufacturing investment will be at an annual rate of \$36.5 billion in first-quarter '62, up from estimated '61 total of \$34.5.

Here are first-quarter plans for some CPI segments (at annual rates): chemicals, \$1.7 billion, up from \$1.65-billion rate of last three quarters; petroleum and coal, \$2.8 billion, down from \$2.85-billion rate of third- and fourth-quarter '61; textiles, \$550 million, same as present quarter. Estimate for stone, clay, glass is \$120 million, and rubber, \$5 million.

•  
**Newsnote from abroad: Government-sponsored Japan Synthetic Rubber Co.** this month will export 500 tons of SBR (worth 90,000 pounds sterling) to Red China. This boosts the firm's total SBR exports for the year to 7,000 tons, including 2,730 tons to Russia.





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## Armour idea chemicals at work



Photograph courtesy of the Tivoli Brewing Co., Denver, Colo. (Information supplied by consultant, The Larsen Kilpatrick Co., Denver, Colo.)

### Less foam at the brewery

Like many other processes, beer making needs a cooling device...a heat exchanger. And with it comes the usual bother: you have to clean away scale that forms on the galvanized piping.

The old answer was hydrochloric acid. But hydrochloric brings its own problem: foaming. It's a nuisance to work with. More, it tends to eat away the zinc coating—then the pipe is open to corrosion.

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Perhaps you have a use for an *Armohib* corrosion inhibitor. They are equally effective in pickling operations...de-liming boiler lines...cleaning refinery equipment...acidizing oil wells. In the processing

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EXCLUSIVE FROM GENEVA

## 'Vast Conspiracy!' Asserts Aries

Robert S. Aries, accused of pirating trade secrets from several U.S. companies, insists that he's the victim of a conspiracy "brewed" by his prime adversary, Merck & Co. The latter's motive, says Aries, is to protect its "vast profits" on the poultry drug it says he stole from it.

The fast-moving, 42-year-old industrial consultant has been appearing at regular intervals before an investigating magistrate in Geneva, who will determine whether or not there is a prima facie case that warrants bringing Aries to trial (*CW*, Nov. 25, p. 23). Between court appearances Aries, who faces eight similar civil and criminal suits in this country, is usually almost unreachable. But last week he agreed to tell his story to a *CHEMICAL WEEK* reporter in Geneva.

**Files Countercharges:** Using attack to bolster his defense, the balding, roundish, former college instructor, chemical engineer, economist, consultant and author has filed countersuits in Paris against Merck and its French subsidiary, Synorga.

Merck says it got vital evidence leading to a complete confession from an employee it says stole information on Amprolium, Merck's new coccidiostat, when Aries licensed Synorga to make his poultry drug, Mepyrium.

Aries contends Merck has "stolen my information and then legalized the theft by purchasing a 51% interest in the French company."

Regarding the actions in Geneva, Aries calls these suits "an exact duplication" of the Merck suit in the U.S., says they are "based on the same charges and allegations, including those with criminal aspects." However, whereas Merck is asking for more than \$7 million in the U.S. action, in Geneva it is asking, he says, for "less than 3%" of that sum because it "realizes that their damages claim will have a bearing on countersuits I intend to bring in Geneva."

Aries charges his name came out as defendant in Geneva "because of leaks planted by Merck in New York

to create the impression that many companies are after me." The magistrate has ordered official secrecy in Geneva.

He declined to comment on U.S. trade-secrets suits brought against him by Sprague Electric Co. and Rohm & Haas because he knew of them only through press items.

"I have been served no papers," Aries said, "but these alleged suits may all be part of Merck's campaign to enlist other companies against me."

"Merck," he charges, "is attempting to discourage all competition in order to obtain a worldwide monopoly for this drug."

**Brusque Denial:** Aries brands as "fantastic" the statements attributed to the former Merck engineer who is said to have turned over the Amprolium data to him.

"The statements allege that this engineer gave me information in the fall of '59 on amino pyrimidine," he said. "In reality, I have a dozen witnesses, including chemists, engineers and professors, some of whom already have testified and others who will testify in Geneva and elsewhere in

Europe, that the product had already been synthesized in '57."

Aries made it plain that he has no intention of returning to the U.S. to face the suits pending here until the end of the Paris action. "I am going to win my French suit," he said, "and then, armed with that victory, I intend to defend myself against all the allegations that Merck is making against me in the U.S."

**Merck's Comments:** When asked for their reaction to Aries' statement, Merck officials pointed to what they called the "complete illogic" of the conspiracy charge. Aries, they say, has licensed Sterling Drug, Hoffmann-La Roche, and an unnamed British company to produce Mepyrium. If these companies believed Aries, they could have gone ahead and scored heavy profits marketing the product, according to the Merck account; instead, when they heard Merck's evidence, they called a halt to production plans, at substantial financial loss.

As for the Paris countersuits, Merck maintains that they have no bearing on the main charge and were filed merely to divert attention.

## Fibers Feud Flares into Open

A feud of at least four years' standing broke into the open last week when Du Pont filed a "misappropriation of secret processes" suit against Von Kohorn International Corp. (White Plains, N.Y.); and Von Kohorn—in a heated statement of denial—said it plans to file a countersuit against Du Pont.

Du Pont contends that Von Kohorn hired 15 or more technical employees of Du Pont and of Ducilo, Du Pont affiliate in Argentina, and induced those persons to reveal information—including blueprints and operating manuals—about Du Pont equipment and processes for production of cellophane, nylon filament, polyester fiber and polyester film (*CW Business Newsletter*, Dec. 9).

Those charges, Von Kohorn declares, "are baseless." President Henry Von Kohorn says his firm "has designed, built and operated more man-made fiber plants than any other organization in the world," but "has never built a plant using Du Pont's continuous polycondensation process nor any other so-called secret Du Pont process."

"This is not the first time that Du Pont and Ducilo have attempted to interfere with the activities of Von Kohorn," he continued. "In '57 officers of Ducilo took steps to prevent Von Kohorn from building a competitive cellophane plant . . . to preserve their monopoly in Argentina. Von Kohorn officially complained to Du Pont about this matter."



## Borrowing to Build

**Financing moves on the part of four chemical process companies were in the news last week.**

Largely to finance chemical projects, The Borden Co. (New York) sold \$50 million worth of 4% sinking-fund debentures through a syndicate headed by Morgan Stanley & Co. Proceeds will go into the methanol and vinyl acetate plants (cost: \$16 million) under construction at Geismar, La. The funds are also earmarked for "continuing development and diversification of the company's business, particularly in the fields of specialty food products and chemicals." Borden will guarantee \$14.75 million of a loan obtained by 50%-owned Monochem, Inc., to build acetylene and vinyl chloride plants at Geismar.

Speaking before financial analysts in New York, President John Denton of Spencer Chemical (Kansas City, Mo.) said his company is negotiating with an insurance company for a \$35-million loan at 4%. Proceeds will be used to retire all current long-term debt and leave about \$14 million, much of which, Denton said, will be invested in new projects.

When projects now under construction are completed, Denton predicts, sales should be about \$108 million, and the net return on the new investments should be greater than 10%. Because of heavy startup costs this year, Spencer's earnings will be held to about \$2.30 share, or the same as last year.

Reynolds Metals (Richmond, Va.) aims to boost '62 sales volume with the help of a \$25-million private placement of notes by a subsidiary, Reynolds Aluminum Acceptance Corp. The new capital—bearing interest rates of 5¾% on \$20 million and 6% on the other \$5 million—will be used to help customers finance purchase of aluminum products.

Another private financing was detailed recently by Thomas War, executive vice-president of Pacific Engineering & Production Co. (Henderson, Nev.) As a witness in the Penn-Olin antitrust trial in Wilmington, Del., War testified that his company borrowed about \$2.4 million from American Cyanamid to build a 5,000-tons/year sodium chlorate plant and to double ammonium perchlorate capacity to that same amount. Terms: 4½% interest;

Cyanamid has one option to buy a license on Pacific processes; and another option to acquire all assets of Pacific or to buy enough common stock to have a 50% interest in Pacific. But War tells *CW* that Pacific plans to repay the loan in dollars, and that Cyanamid has no management role in Pacific.

War said Pacific now has 63 employees, assets of about \$2 million, and sales volume in the range of \$1-1.5 million/year.

## Hope for the Industry

**Chemical management, according to four Wall Street diagnosticians, has been over-expansive and under-inventive during the past few years. That, they say, accounts for the industry's current profit squeeze and the waning of investors' ardor for chemical stocks.**

But these four financial and investment executives—speaking at the final session of last week's American Institute of Chemical Engineers meeting, held in New York's Commodore Hotel—see hope that the chemical industry is now mending its ways.

Francis Williams, president of The Chemical Fund, said the industry has been too quick on the trigger in adopting expansion programs. A company should not expand a plant unless it's sure it can sell the increased output, he went on. He advised more research on process improvements.

Christopher Boland, former chemical industry man now with Kidder, Peabody & Co., pointed out that many of this industry's newcomers—such as oil companies—have pricing and accounting policies that have hurt chemical prices.

W. I. LaTourette of Shearson, Ham-mill & Co. said Wall Streeters think the chemical industry has been more victimized than benefitted by diversification, and that backward integration into raw materials is regarded as particularly "unexciting."

William Grant of Smith, Barney & Co. saw two hopeful signs for chemical companies' stockholders: "very little" equity financing is to be expected during the next few years; and chemical company executives are no longer making the kind of public statements about this industry's growth and earnings prospects that several years ago served to attract new competitors into the industry.

## Indicting and Pleading

**The antitrust mills were grinding slowly last week in New York, Chicago and Washington.**

In New York, a federal grand jury indicted Engelhard Industries, Handy & Harman, United Wire & Supply, Westinghouse Electric, and eight executives of those companies on charges of price-fixing on brazing alloys made of silver, copper, zinc and phosphorus. Spokesmen for the companies retorted that the industry "is in fact very highly competitive and profits have been marginal."

Also in New York, 45 investor-owned electric utility companies filed triple-damage civil suits under the Sherman antitrust act, asking judgment against 29 electrical equipment manufacturers for alleged overcharging. These suits were based on the conviction of General Electric, Westinghouse and other electrical equipment makers last winter on price-fixing charges. The chemical industry has been buying electrical equipment at the rate of \$50-\$75 million/year; but chemical company lawyers last week said they were not now planning to file similar suits.

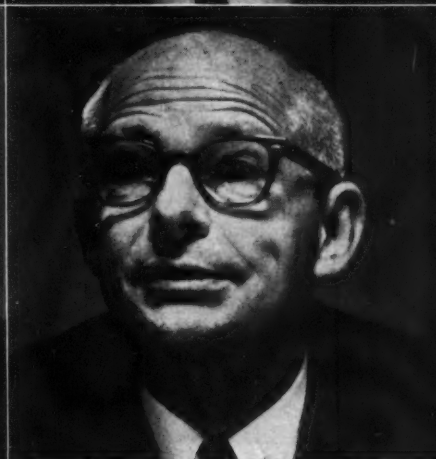
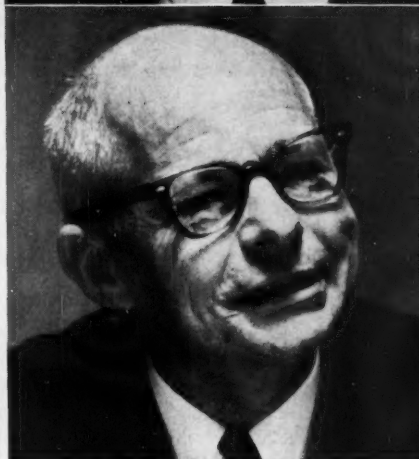
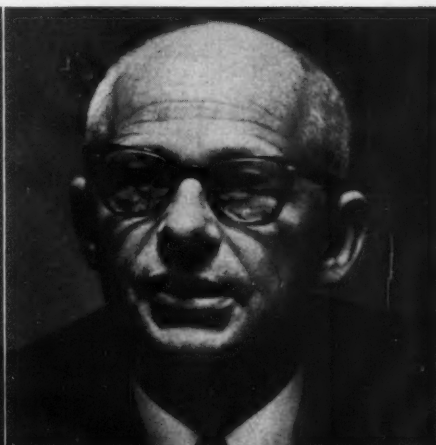
In Chicago, Du Pont President Crawford Greenewalt explained how the company now proposes to divest itself of its 63 million shares of General Motors stock. Possibly 11 million GM shares, he told Judge Walter J. LaBuy, could be exchanged for Du Pont shares; perhaps 15 million shares could be issued in lieu of cash dividends on Du Pont stock; some 1.5 million GM shares might be donated to charitable trusts; and the remaining 35.5 million GM shares would have to be sold. But Du Pont attorneys asked that LaBuy postpone his decision on a plan for divestiture until Congress has a chance to act on the tax relief bill now pending.

Lawyers for Christiana Securities—the largest owner of Du Pont stock—again argued that the court does not have power to order Christiana to dispose of any GM shares it gets from Du Pont. And they offered evidence in reply to the contention that its major stockholders—Du Pont family members—act as a "cohesive group."

In Washington, the U. S. Supreme Court heard arguments on the Brown Shoe Co. case, which poses several basic problems in antimerger law.



## President's tariff-cutting plan draws chemical leader's fire



*'We . . . must adjust our trading tools to keep pace with world . . . patterns.'*

*'How can sane people believe such . . . gobbledygook? . . . The only two groups who should be for Kennedy's program are the extreme right and extreme left.'*

## Firing Salvo at New Tariff Plan

A strenuous campaign to keep U.S. tariff law "as is" was launched last week by the Synthetic Organic Chemical Manufacturers Assn. (SOCMA) in a quick retort to President Kennedy's efforts to win management and labor backing for a major overhaul of trade and tariff policies.

What the U.S. needs most, says SOCMA President and Dow Chairman Carl A. Gerstacker, is not to be on a competitive level with Western Europe, but to improve its domestic industrial growth. SOCMA's proposals: (1) stop inflationary wage increases; (2) improve the tax structure; (3) stop "harassing" industry and thereby increasing the profit squeeze; (4) improve the patent situation; (5) en-

courage creative research, development and marketing.

What kind of competition is it when the wage scale in one country is 8-10 times that of another? SOCMA asks. Well-paid American jobs, Gerstacker says, will be lost to other countries, where people are willing to work for less.

SOCMA charges that the government manipulates the tariff laws for its own immediate ends. In the '50s, when overseas countries needed our dollars, we lowered tariffs so that we could trade, rather than just give foreign aid. Now, when we are trying to return dollars to this country, the same tactic is being used. How, SOCMA asks, can the same method

solve two opposite purposes?

It is inevitable, says Gerstacker, that U.S. exports will fall and imports will rise. (Some of SOCMA's members now earn more than 10% of their profits from overseas production and/or marketing operations.)

SOCMA is spending \$25,000 to find out what the effects of different tariff reductions will be on segments of the chemical industry. It is also working with the Interindustry Committee, a two-month-old organization of trade associations interested in tariff problems. Publicity and letters to congressmen will be used. And when the House Ways & Means and Senate Finance committees hold hearings on tariff bills, SOCMA will be there.





Lilly's Beesley, Merck's Connor favor some changes in drug laws.

## New Turn in Drug-Law Tiff

Odds have suddenly shot up for agreement between the pharmaceutical industry and its chief inquisitor, Senator Estes Kefauver (D., Tenn.), on a compromise version of Kefauver's bill to amend the nation's drug and patent laws.

In Washington last week, in a two-day hearing requested by pharmaceutical industry leaders, President Eugene N. Beesley of Eli Lilly & Co. and President John T. Connor of Merck & Co. told Kefauver's anti-trust subcommittee that they support a number of his proposals.

And even though they emphasized that they could not go along with the exact language of any part of the bill as it now stands, they said the Pharmaceutical Manufacturers Assn. agrees with the principles involved. Kefauver smilingly remarked that they had reached "rough agreement."

**Conflict on Patents:** As PMA Chairman Beesley read his 30-page statement to the subcommittee, it was evident that Kefauver's proposed changes in the patent laws are most unpalatable to the industry. Kefauver—who contends that pharmaceutical companies use patent protection to keep drug prices high—is asking Congress to cut down on the 17-year life of drug patents.

Under his bill, the holder of a new drug patent would have exclusive patent rights for only three years; and

for the next 14 years, would be required to grant licenses to any qualified manufacturers at a maximum royalty of 8%.

The bill also would prohibit granting of patents for "molecular modifications" of existing drugs unless the Secretary of Health, Education and Welfare determined that the new compound had significantly greater therapeutic effect than the original drug.

**Inventive Incentive:** These provisions are unfair, Beesley complained, because they would restrict patent rights for the drug industry only.

His own company, Lilly, now spends about \$20 million/year for research, Beesley declared, and "I know we could not continue to risk such investments if other manufacturers . . . could share in our discoveries simply by asking, without making any investment in research or any scientific contributions."

Connor agreed. He said Merck recently reviewed its 1962 research program, looking at each item in the light of the Kefauver bill's present provisions. "We found that there would be wholesale deletions from and revisions in our entire research program if we were confronted with enactment of the bill. We simply could not justify to our stockholders the continuance of most of our research projects without the assurance of effective patent protection."

## Eyes on the Label

At last week's 48th annual meeting of the Chemical Specialties Manufacturers Assn. in New York's Hotel Roosevelt the biggest topic of interest was the Federal Hazardous Substances Labeling Act. It's scheduled to go into full effect Feb. 1 barring a postponement, which Rep. Joe M. Kilgore (D., Tex.) will try to get when Congress reconvenes.

John L. Harvey, deputy commissioner of the Food and Drug Administration, told of how the agency sees its role as enforcer of the act and how it interprets some of the act's ambiguous points. Gist: FDA has much sympathy for the problems faced by a manufacturer who tries to conform to the law, but will make few concessions to would-be evaders of the law.

Some FDA hard-as-granite stands: the 5-gram rule as a definition of "toxic by ingestion"; methods to be used for determining toxicity, irritation or corrosiveness of materials (FDA prescribes specific methods); and main front panel warning designations.

Areas that seem to hold promise of less rigid interpretation of the act than first outlined include labeling of aerosol packages, and arbitrary designation of certain chemicals (e.g., methanol, turpentine, kerosene) as "highly toxic" no matter what their concentration.

Harvey wouldn't commit himself on the possibility of a postponement on the act, urged manufacturers to start revising their labels in accordance with the law. Consensus of those in attendance was that a postponement will come because of the monumental task entailed in compliance and enforcement programs.

Officers chosen to head CSMA in '62: Charles E. Allderice, Jr., Bell Co. (Chicago), president; and Donald J. Templeton, Stanley Home Products (Westfield, Mass.) and Earl Brenn, Huntington Laboratories (Huntington, Ind.) as first and second vice-presidents, respectively. Named to the board of governors: Irving Gaines, Onyx Chemical (Jersey City, N.J.); W. Earl Graham, Clayton Corp. (St. Louis, Mo.); Alston G. Bowers, Pioneer Mfg. Co. (Cleveland).

Next CSMA meeting: Chicago, May 14-16, 1962.



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# national roundup

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## Companies

**M&R Refractory Metals** is the new name chosen by Metals & Residues (Springfield, N.J.) to reflect its move into prime metals. M&R is involved in research, development and production of various refractory metals for industry and the military.

**Reynolds International** (Hamilton, Bermuda) has reached agreement for acquisition of Aluminum Extruders Ltd., wholly owned subsidiary of Kruger Organization Ltd. (Montreal). Reynolds International, subsidiary of Reynolds Metals Co. (Richmond, Va.), aims at "energetically developing new products and new markets in Canada."

**Diamond Alkali** (Cleveland) has established a Western division at Redwood City, Calif. The new division, formed as a result of Diamond's acquisition of Chemical Process Co. (*CW Business Newsletter*, Nov. 18), will be headed by Alexis E. Post, Chempro's president.

**Alloys Unlimited** (New York) has acquired MonoSilicon Inc. (Gardena, Calif.) in exchange for 18,000 shares of Alloys common stock—current value: about \$16/share. MonoSilicon manufactures single-crystal silicon for the semiconductor industry; Alloys Unlimited produces and markets subcomponents for the electronics industry.

**Boron Fuels:** Callery Chemical Co. (Callery, Pa.) has been awarded a \$1.6-million contract by the Air Force for continued production of pentaborane at its plant in Muskogee, Okla. Funding will carry production to the end of January, completing Air Force's original contract; it does not represent any renewal of interest in the controversial boron fuels (*CW Washington Newsletter*, Oct. 7).

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## Expansion

**Potash:** Duval Sulphur and Potash Co. (Houston, Tex.) is nearing completion of an expansion at its potash property near Carlsbad, N.M. (*CW*, July 8, p. 25). New screening and granulation facilities will allow Duval to supply granular potash, in addition to coarse and standard grades.

**Molecular Sieves:** Linde Co. Division of Union Carbide (New York) is nearing completion of a \$1-million expansion of its Tonawanda, N.Y., molecular sieve plant. New capacity will be 100 tons/month.

**Fertilizer:** National Distillers and Chemical Corp.

(New York) is enlarging the storage capacity of its fertilizer-producing subsidiary, Federal Chemical Co. (Louisville, Ky.) This is another move in a three-year expansion program in which the company will spend \$100 million. Included: a polyethylene film plant at the Kordite Division (*CW*, June 10, p. 28), a \$15-million linear polyethylene plant as a joint venture with Owens-Illinois Glass (*CW*, July, 15, p. 25); and a \$25-million helium extraction plant as a joint venture with Panhandle Eastern (*CW Business Newsletter*, Oct. 21).

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# foreign roundup

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**Titanium/Norway:** National Lead (New York) and Quebec Iron and Titanium (Sorel, Que.) will study the feasibility of treating Norwegian ilmenite by an electric furnace process that converts ilmenite ore into pig iron and a slag of high titanium content. The ore will come from the Tellnes mine of National Lead's Norwegian subsidiary, Titania A/S (near Hauge i Dalane). Norwegian ilmenite concentrate is now shipped directly to European titanium pigment manufacturers. If the project is successful, a smelter accommodating 600,000 tons/year of ilmenite concentrate will be built adjacent to the Tellnes mine.

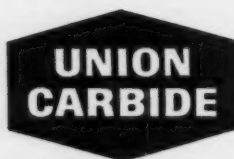
**Aluminum/Belgium:** Aluminium Ltd. (Montreal) has purchased controlling interest in Aluminium Raeren S. A. (Raeren, Belgium), a new aluminum extrusion company. This is Aluminium's second plant in the European Common Market.

**Pharmaceuticals/Peru:** Merck's Peruvian subsidiary, Merck Sharp & Dohme (Peru) S.A., has started manufacturing operations at its new Lima plant. Products include vitamins, corticosteroids, and antibiotics.

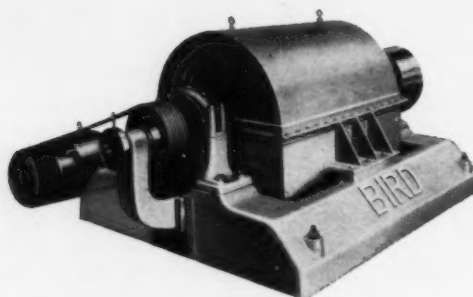
**Naphtha/Japan:** Japan should remove the duties on naphtha for petrochemical use, urges the Energy Council, an organ of the Ministry of International Trade and Industry. Basis for the proposal: a survey indicating naphtha was more expensive in Japan than in Europe. The Tariff Council is now considering a revised rate schedule.

**Petroleum/Spain:** The Spanish government is exercising its option to acquire 50% of Cia. Iberica de Petroleos, previously wholly owned by Banco Iberico. The move means that Union Oil of California will now have state participation in Spanish exploration rights it holds with Iberica de Petroleos. It also gives the government an indirect additional 2% interest in a new refining company owned by itself, Ohio Oil, Iberica de Petroleos, and Spanish banking interests.





Union Carbide Corporation started up their first BIRD Continuous Centrifugal at the Carbide & Carbon, So. Charleston plant in 1940. Additional BIRDS have gone to work almost every year from then on. You'll find them performing a variety of solid-liquid separations in a number of Union Carbide's far-flung plants.



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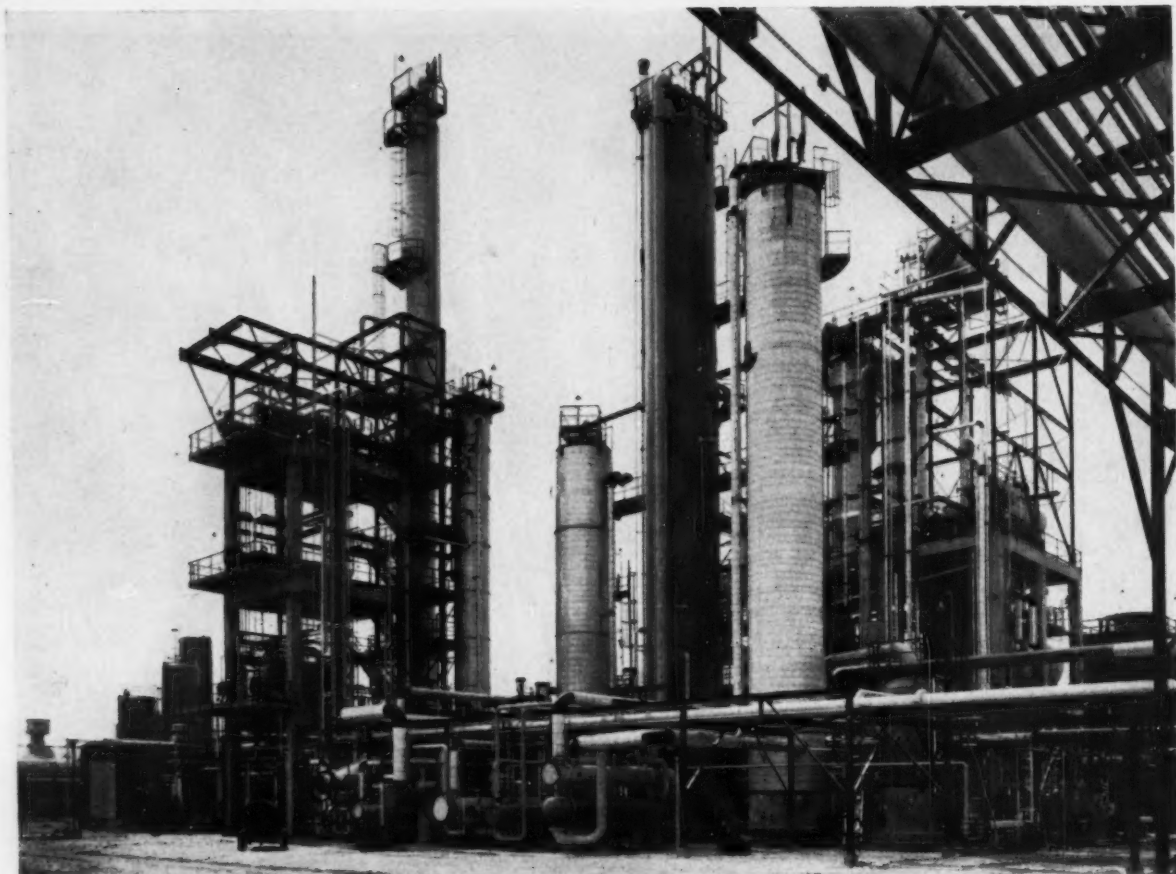
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## Olin Mathieson's 55 million lb./yr. ethylene oxide plant has fast, smooth startup

Olin Mathieson Chemical Corporation's new ethylene oxide plant at their Doe Run Works, Brandenburg, Kentucky, started up smoothly and rapidly after completion by The Lummus Company one month ahead of schedule. The installation has already proved its capability of exceeding its design capacity of 55 million pounds per year.

The ethylene oxide is converted into derivatives for use in the manufacture of antifreeze, industrial coolants, hydraulic brake fluids, detergents and chemical intermediates.

Engineered and constructed by Lummus, this new plant employs the Shell Development Company's process for direct oxidation of ethylene to ethylene oxide. It is the fourth such unit to be undertaken by Lummus in the last several years, and Lummus is

currently working on a fifth Shell Process plant, this one for SunOlin Chemical Company at Claymont, Delaware. Advantages of the process include unusually high yields and virtual elimination of the waste disposal problems encountered in the classic chlorohydrin process.

For ethylene oxide, or for any type of chemical or petrochemical plant, call on Lummus' half century of experience on more than 900 plants for the process industries around the world.



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December 16, 1961 CHEMICAL WEEK 29



# **BENZENE:**

**Shell increases benzene capacity 500 per cent. Can now fill orders anywhere from 3 refineries. Mammoth storage system can make benzene available on a local basis.**

Shell now has the largest benzene-producing capacity in the world. It exceeds 80 million gallons a year. An increase of nearly 500 per cent in less than 18 months.

Shell benzene now comes from 3 refineries. You can take delivery by barge, truck or tank car—depending on your location.

You can get all the benzene you need, when you need it. Read the facts below.

THE DEMAND for benzene has soared. New uses are coming along every year. Shell has answered the need with a massive increase in capacity.

## **Bigger supplies now**

Shell's annual benzene production capacity tops 80 million gallons of high purity product. *Production and distribution facilities are nationwide.*

Three Shell refineries can now produce benzene: Wood River, Illinois; Houston, Texas; and Wilmington, California.

## **Shipments come by barge, tanker, tank car or truck**

All three are located near waterways to make possible direct barge or tanker shipments—a great potential saving. Shipment can also be made by tank car or transport truck.



Shell's production and storage points are strategically located to facilitate supply of high purity benzene (see map above). All Shell's benzene-producing refineries are on major waterways. Inland locations make possible delivery by tank car, truck or barge.

Wherever the demand justifies, Shell's enormous nationwide storage facilities (see map) can be used for benzene. Strategically located across the country, these facilities make Shell benzene potentially available on a local basis.

## **Shell benzene is Thiophene-free**

Manufacturers choose Shell benzene when quality must be consistently high. It is Thiophene-free.

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## SPECIALTIES



Bookbinding and carton sealing make a \$10-million hot-melt market.

## Hoisting Hot Melts' Hopes

Improved resins and new applicators, along with lower prices and more producers, are currently rocking the synthetic hot-melt adhesive industry. Since the late '40s hot-melt binding of cartons, books, frozen food packages and metal cans has grown to an \$8-10-million adhesive market. Now, industry experts sight a \$30-35-million market by '65.

It's difficult to single out the event that makes adhesive makers optimistic. The two most recent ones, however, took place last month. Reichhold Chemical Industries (White Plains, N.Y.) started production of polyamide resins—with a significant amount tagged for hot-melt adhesives—at its Elizabeth, N.J., plant. At the same time Acumeter Laboratories (Lower Newton Falls, Mass.) and Stein, Hall (New York) broke the news that their lightweight, low-cost hot-melt applicators were commercially available.

And just a few months ago Du Pont cut the price by 22% of its just-intro-

duced Elvax resin—ethylene-vinyl acetate-natural wax hot melt—which is now volume-priced at 45¢/lb. Du Pont expects to double present Elvax capacity at its Orange, Tex., plant by the end of '62.

Still further activity is in view. Shawinigan Resins (Springfield, Mass.), long a major factor in hot melts with its polyvinyl acetate Gelva and polyvinyl butyral Butvar, expects to commercialize its own ethylene-vinyl acetate copolymer soon. This product is now being field tested.

**Slow Starter:** Nearly all hot-melt authorities readily credit improvements in applicators as the longest technological step ahead. Ever since polyvinyl acetate types were introduced, a little more than a decade ago, hot-melt growth has been cramped by lack of proper machinery. Most of the large, bulky machines—often 30 ft. long—had been designed for the natural hot melts, like waxes and asphalts, which had been used in package bonding for years. And aside

from unwieldiness, production speeds of the machines weren't high enough to handle the fast-setting, new synthetics.

Now several manufacturers claim to have solved these problems with machines that cost from slightly under \$2,000 to \$5,000, take up far less space and can apply the hot-melt adhesives at high speeds.

Acumeter, for one, touts its Acumelt as "probably the first all-purpose applicator, able to handle any type of melt adhesive." According to company President Donald McIntyre, the Acumelt weighs only 120 lbs., can accommodate up to four different hot-melt lines at once. The company leases the applicator—for \$2.75/hour for the first 500 hours, \$1.80/hour for the second 500 and 78¢/hour thereafter.

But Acumeter has stiff competition from other applicator makers. One of them is Potdevin (Teterboro, N.J.), which supplies National Starch and Chemical Corp. with its hot-melt applicators. National, in turn, sells this line—called Instant-Lok machines—with the company's same-named hot melts.

Applicators are available in various dimensions, range in weight from 80-150 lbs. and take up about 4-6 ft. of factory space. Big point for packagers: an Instant-Lok applicator can discharge up to 1,200 ft./minute of hot-melt adhesive. And National seems eager to continue pushing this development; the company exhibited two new Potdevin additions to its line at this year's Packaging Machinery Manufacturers Institute show.

**Feet First:** A third firm specializing in applicators is United Shoe Machinery Corp. (Boston, Mass.). It was probably the first company to tie in hot-melt machinery with its own adhesive, Thermogrip. This hot melt was originally formulated by United's B. B. Chemical Division in the '40s for the parent company's shoe manufacturing operations. But United quickly saw opportunities in packaging. It offered application ideas and designs as well as its Thermogrip. And, according to George Upton, Thermogrip product manager, nearly 40 more packaging manufacturers either have just introduced or are now working on applicator models that use United's adhesive and the co-engineered equipment.

**Form and Formula:** Hot-melt ma-



chinery has almost always dictated adhesive formulations and forms. United's Thermogrip experience is a case in point. The United applicator called for a rope-like adhesive, so the Thermogrip was offered on 3- and 15-lb. reels. To make sure that the adhesive would not "block" (stick together), United employed relatively high (about 100,000) molecular-weight resins. This change not only eliminated blocking but also improved compatibility with surfaces and increased bond strength. Recently, Borden and National Starch have also come out with high-molecular-weight hot melts.

**Dissidents:** But other hot-melt experts say these high-molecular-weight varieties provide a major drawback—the price of hot melts is in the 70¢/lb. range. And this can only widen the gap between the synthetic hot melts and the old, stand-by adhesives such as dextrin, which sell for as little as 3-7¢/lb. Hot-melt prices, most adhesive manufacturers say, should be 40-50¢/lb. if they are to attract new customers.

Thus Du Pont's Elvax, although formulated as a high-molecular-weight compound, is mixed with 60% common wax so that it can be competitively priced.

**Molecules or Machines:** Acumeter's McIntyre stresses that "90% of all hot-melt applications would not require high-molecular-weight hot melt if good machinery were available." Practically any of the lower-weight adhesives, such as the vinyl acetates, he says, could do the same bonding job.

The shapes in which hot melts are available has also been under fire. Patrick McGuire, Borden's technical service manager, says hot-melt rope or rods limit the range of polymers that can be used. Also, poor ductility and stress cracking can limit shelf life of the adhesive to as little as three months. Borden pellets, McGuire adds, are priced at 25% less than the rope forms.

**What's in Use:** Regardless of shape, the most common hot melts are the vinyls, which make up 5-8 million lbs. of the total 15-20-million-lbs./year market. Ethyl cellulose and polyethylene, according to one company expert, are fighting it out for the next spot; polyethylene is growing the faster of these two.

But probably the hottest develop-

ment in synthetic hot melts are the ethylene-vinyl acetate copolymers. One large Midwestern adhesive manufacturer sees ethylene-vinyl acetate completely displacing polyvinyl acetate as the top synthetic bookbinder, even cutting deeply into the 8-million-lbs./year animal glue market.

Du Pont's Elvax, which currently holds the lead in ethylene-vinyl acetate hot melts, will doubtless run into increasing competition from other big resin makers such as Shawinigan Resins, Union Carbide and Dow Chemical (Midland, Mich.). Shawinigan is now test marketing an ethylene-vinyl acetate copolymer.

Other ethylene combinations are favored by some adhesive suppliers. Union Carbide, though never officially stating the chemical makeup of its copolymer DPD-6159 (at 32.5¢/lb.), reportedly is pushing an ethylene-ethyl acrylate. And Dow is also on the market with an ethylene-ethyl acrylate, X-3488.2, a developmental material that's selling for 32½-55¢/lb. (depending on the degree of modification).

Polyamide resins, another type of hot melt, seem to be getting a big play. General Mills' Chemical Division (Kankakee, Ill.) calls them unmatched for anything from cellophane to polyethylene and Mylar.

Polyamides sell in the 50-60¢/lb. range, not much above that of the ethylene-vinyl acetate copolymers. Current big uses: sealing potato chip bags, cementing side seams on cans and binding bread-wrapper ends.

On a volume basis, however, polyamides are still probably among the minor hot melts. They have some disadvantages — e.g., they are not compatible with most other resins and may alter when heated at elevated temperatures. However, Lawter Chemicals' Krumbhaar Resin Division thinks it has overcome these drawbacks in its line of polyamides.

There are many other synthetic hot melts. Among them: phenolics and acrylics; blends of polyethylene and polyisobutylene; and polypropylene.

**Work to Be Done:** Hot melts, even with formula and application improvements, still offer some knotty problems. For example, high melting temperatures — up to 400 F — can create safety hazards, and plant personnel may object to working near such heat. And unless machinery

breakdowns are quickly caught, a lot of partially bonded packages could be wasted.

Many hot melts also show brittleness at low temperatures, although most manufacturers can make them flexible (at -30 F and lower) by adding plasticizers.

Scrap dealers are shying away from paper treated with certain types of hot melts because they are difficult to reclaim. Conventionally sealed milk carton waste sells for about \$80/ton; hot-melt-bonded wastepaper for \$17/ton.

These difficulties, plus higher melt prices and the steep cost of development (estimated by some at \$250,000), move some adhesive makers to the belief that hot melts have been oversold.

Nonetheless, the package industry exhibits a great deal of faith in the future of hot melts. These adhesives will likely play a key part in binding a wide variety of product containers.

## PRODUCTS

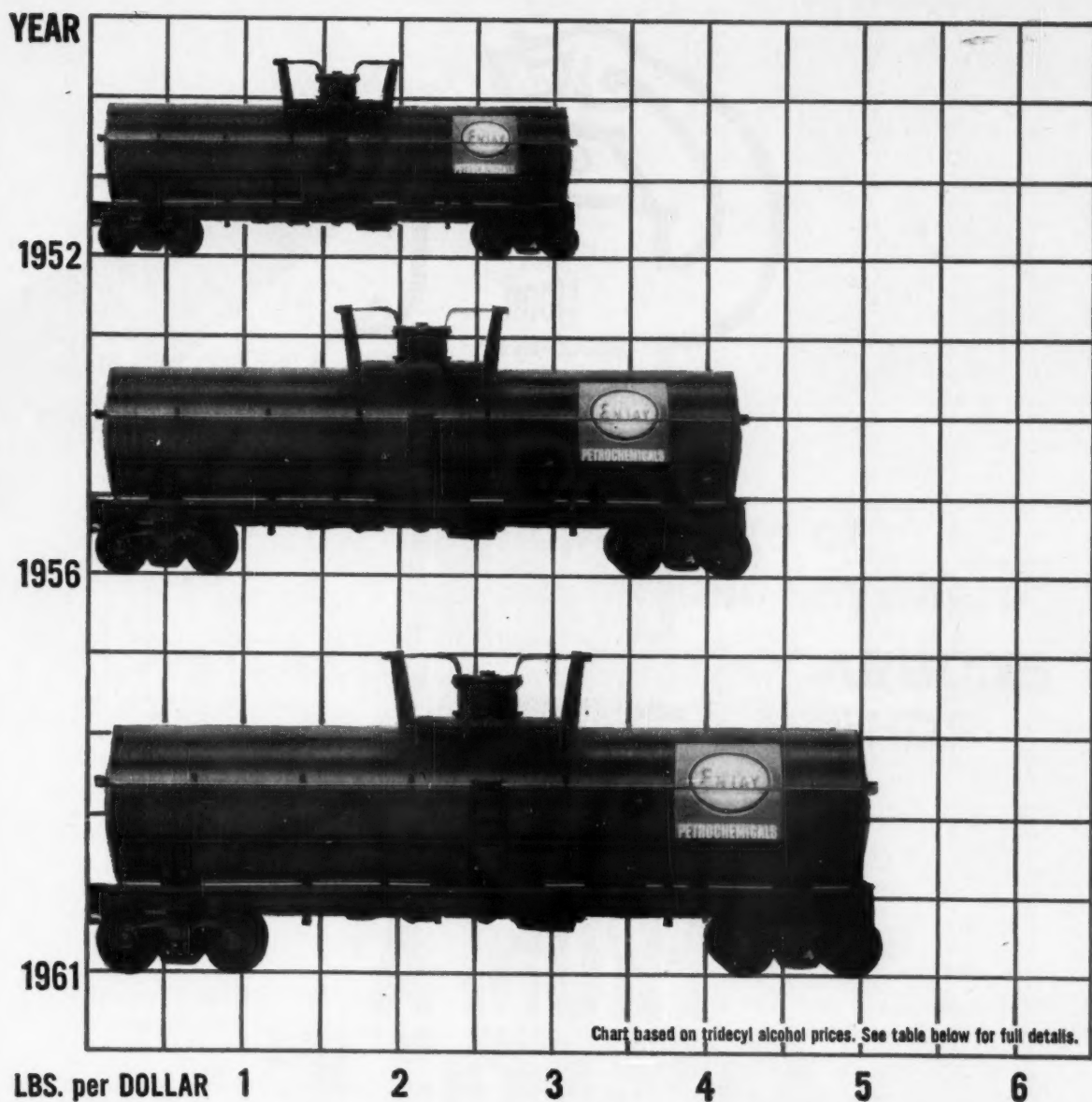
**New Surfactants:** Minnesota Mining Manufacturing Co. (St. Paul, Minn.) has made available on a laboratory control basis 11 new fluorocarbon-type surfactants. The 3M Chemical Division's technical service department will evaluate queries and supply appropriate samples.

**Waterless Washup:** Bonne Bell Cosmetics (Cleveland) is selling its Ten-O-Six facial cleanser, saturated with a lotion, for washing hands and face without soap or water. Retail price: \$1.75/32-towelette carton.

**Paint Primer:** Spencer Kellogg (Buffalo, N.Y.), division of Textron, has developed what it calls the first practical water-thinned primer for all exterior wood surfaces. The new primer is based on Spencer's Linaqua, a water-soluble linseed oil paint material, first marketed last spring.

**Nurses' Aid:** Columbia Wax Co. (530 Riverdale Ave., Glendale, Calif.) has introduced a complete line of germicidal cleaning chemicals for hospital use. The new products include a hexachlorophene liquid soap, Hetra-Phene Surgical Soap; a synthetic phenol disinfectant, HetraCide Germicide; and two detergent germicides.





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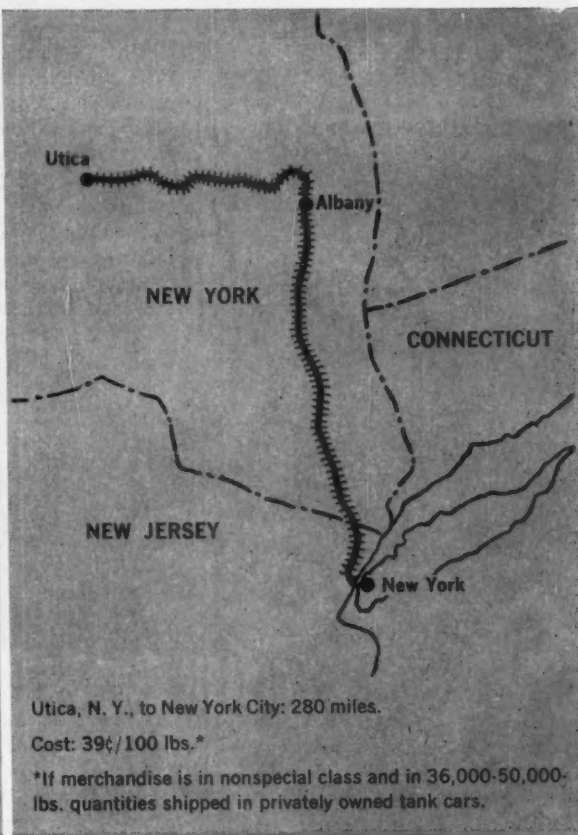
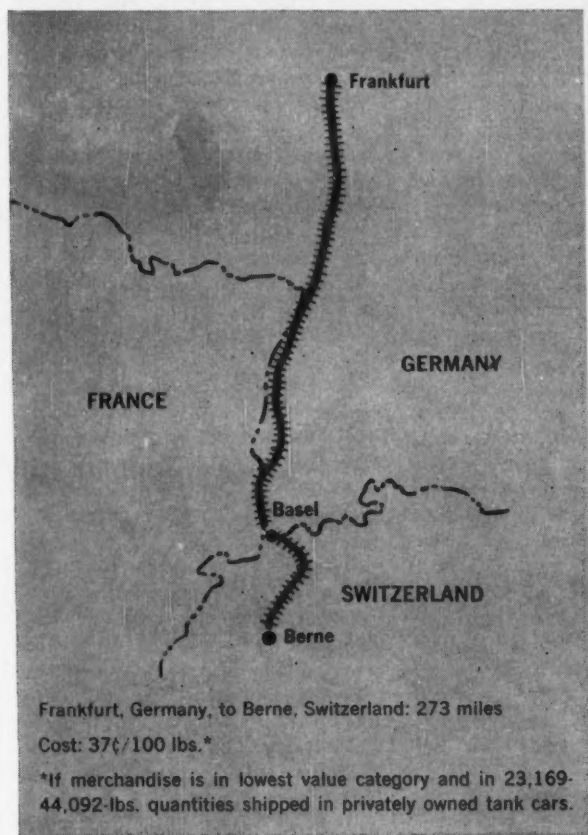
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## Car sizes differ, but pound-for-pound, U.S. and European rail rates are similar



## Sizing Up European Distribution

The jolt of last week's 24-hour transport strike in France—the third this fall—was felt in the U.S. by a number of management men. Reason: as U.S. investment in Europe climbs, management is taking closer interest in the chemical traffic situation there.

To help clarify this picture, *CW* has just finished a survey of major chemical companies in Britain, France and Germany. Here are the key findings on how they sell, how they ship, and what their problems are.

Once the American traffic manager is accustomed to the small railroad cars, less-mechanized loading facilities (labor is cheaper than lift trucks), he finds conditions similar to those in the U.S. Delivery times and rates are comparable (see map, above), and Europe, again like the U.S., shows a trend to-

ward greater use of trucks instead of rails. International boundaries are no major problem—it's usually no more difficult to get a truck across a European border than across a U.S. state line.

Moreover, as is the case in the U.S. (*CW*, Dec. 9, p. 39), European chemical sellers are finding that customers keep inventories low, demand fast delivery.

**Trucks Gain:** The shift to trucks has brought most of the major changes, and a good many of the problems. In Britain, for example, truck use has grown to the point where the major shipping headache is long delays at docks, which were designed for deliveries by rail and where truck handling is a slow process.

Barges do the big job in Germany

(where there is an extensive inland waterways system). Farbenfabriken Bayer figures that of the 3 million tons of chemicals the firm imported in '60, and the 1.4 million tons outgoing, 43% traveled by barge, 30% by rail, and 27% by truck.

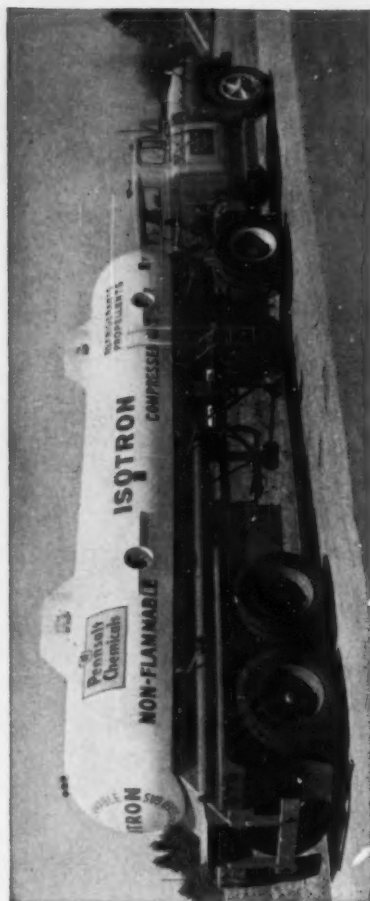
In Germany rail and road rates are officially identical, but big customers usually manage to obtain reductions on trucks through discreet negotiations. As in the U.S., the use of trucks is generally cheaper for short runs, rails for long runs.

In France, water transport is seldom used except in the Northern and Eastern parts of the country, where waterways are more numerous. Also, French barges are small—capacities are 200-600 tons. French chemical shippers generally find trucking cheap-





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## SALES

er than rail transport because highway haulers don't demand demurrage. On railroads, demurrage charges mount, of course, when freight cars are held on sidings.

**ICI Example:** Britain's Imperial Chemical Industries is one of the biggest customers of British Railways, but also uses trucks extensively. Bulk solids are shipped mostly by rail, as are fertilizers, but considerable road transport is used. Bulk liquids are sent over both routes, with the greater number of tons (not ton-miles) going by road. Plastics and dyestuffs are sent chiefly by truck. Many of ICI's plastics and dyestuffs customers have small plants, built since the war, and these often do not have rail sidings.

In shipping bulk liquid chemicals to the Continent, ICI uses ships and rail cars carried on ferries. After finding roll-on, roll-off road tanker service (tank trucks ferried across) uneconomical for its purposes, the company has begun serious testing of demountable tanks.

Trans-channel trade would be conveniently speeded if a bridge or tunnel, being considered to link Britain and France, becomes a reality (*CW*, Sept. 23, p. 102). A bridge would carry both road and rail shipments; the tunnel would handle only rail traffic.

**Easy Going:** International agreements have simplified international transport of chemicals. This is particularly true within the Common Market. Customs are not a great problem—for example, a rail tanker from the United Kingdom destined for Austria will be sealed on arrival in France or Belgium, pass successive borders untouched until it arrives at its destination.

Other agreements cover such details as rail safety. One problem: rail cars used both in the U.K. and on the Continent must be fitted with dual braking systems, since British and European requirements are different. On the other hand, rail gauges are uniform except in Spain, Portugal and Russia.

European integration of transportation facilities has progressed further in rails than in other modes of transportation. Standard truck specifications have been slow to come, despite the rising use of these vehicles. Currently, it is the practice of governments to set quotas defining how much freight

can be carried by foreign trucks within their borders. German truckers complain that their government is more generous toward neighbors in this regard than the neighbors are toward German truckers. Another damper on German trucking: the Bonn government insures that the Federal Railways get a sizable amount of business by restricting the amount of goods which can be transported on vehicles owned by producers.

At the same time, Germany is experiencing a shortage of tank cars, due primarily to an oil consumption boom. This shortage should ease in two or three years, after the completion of pipelines to the new refineries in southern Germany. Outside of Germany, however, no shortage of transport facilities is reported.

**Middlemen:** Generally, the large European chemical producers make little use of distributors. In France, the government is trying to change this. Contending that French chemical companies have so much money tied up in widespread storage facilities and containers that their chemicals can't be priced as low as those from other nations, the government is urging use of such middlemen. The government hopes to get producers to handle directly only about 60% of their distribution—only that in tank-car or larger quantities.

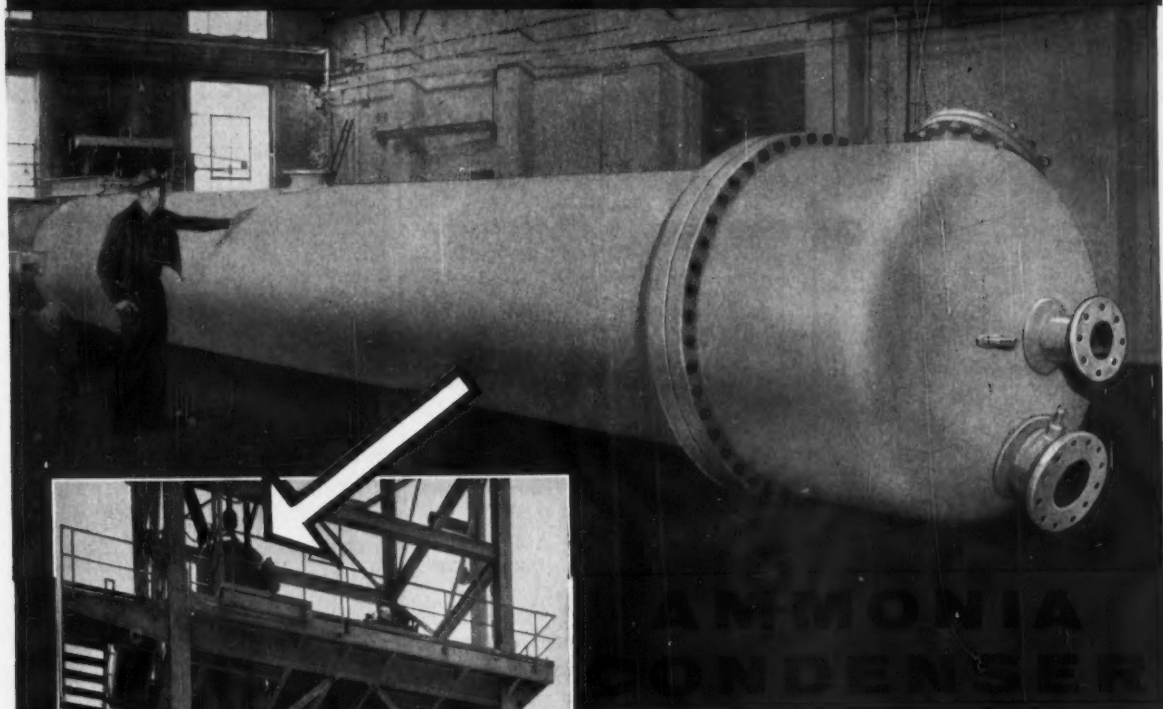
ICI and other large U.K. chemical companies also tend to make less use of distributors than do U.S. companies, but they use them more than French concerns. Customers, both at home and on the Continent, are serviced from ICI's many depots in Europe. It does have agents in many countries, however, and sells some items through "merchants" (combination chemical supply houses and export-import houses).

Many smaller U.K. chemical companies also currently use these merchants, both for domestic distribution and for sales to the Continent. The merchants act both as principals, purchasing material outright from the manufacturer, and as agents.

**Forwarding Agents:** The merchants, as well as small and large chemical producers, also frequently use freight forwarding agents. And many small companies use forwarding agents' groupage schemes, whereby a complete freight car is loaded with odd lots destined for, say, Swit-



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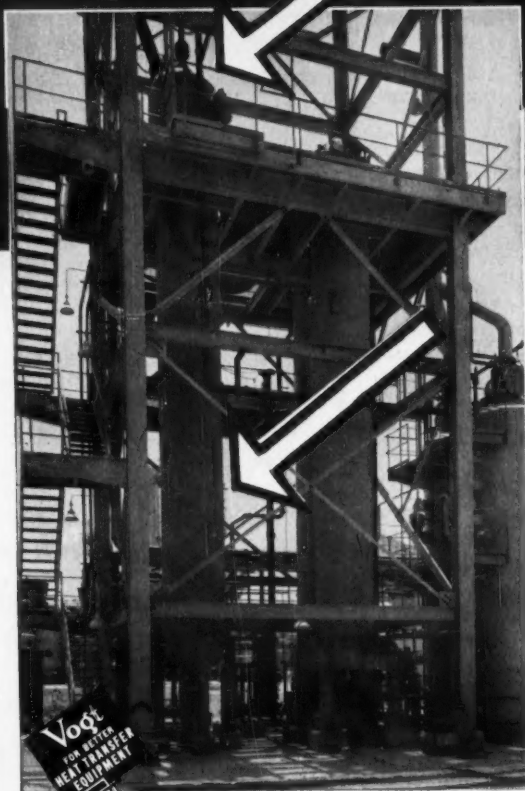


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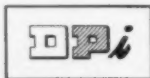
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### SALES

zerland. And many firms distributing in Europe — both European companies and American—use specialized storage and distribution services such as that provided by Pakhuismeesteren N.V. of Rotterdam. This company specializes in maintaining large stocks of chemicals in Rotterdam (a free port) and other distribution centers. By having the chemicals near the customers, it is possible for American and other non-European companies to make the quick deliveries necessary to compete in today's buyers' market.

Delivery time in Europe is comparable to that in the U.S. Some examples: German and Swiss railways guarantee delivery within 24 hours for every 125 miles; in England, a trip of about 210 miles would take three to four days by rail, 24 hours by truck (full load), or up to a week for less-than-carload.

One of the more important parts of the Common Market program is aimed at facilitating the transport of goods from one member country to the others. Aside from simplifying border customs, this permits the wider use of foreign trucks and other equipment, plus greater standardization of facilities. As this work progresses — and as more countries are brought into the Common Market—distribution within the Continent should become considerably simpler.

### O-I Opens Up

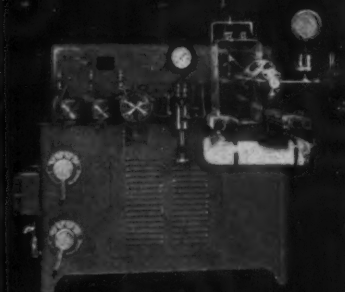
Owens-Illinois Glass Co. (Toledo, O.) has formed a new **Plastic Products Division**—its eighth operating division.

Ray H. Mulford, president of O-I, says: "The new division will be responsible for the manufacture and sale of plastic products now made by O-I, including the semirigid blow-molded plastic container, and eventually its activities will extend to other processes and products related to plastics."

He adds, "Dividing the Closure and Plastics Division into separate operations also enables O-I to give increased emphasis to the production, development and sales of closures as well as plastic products. Production of closures and fitments for glass bottles and jars is becoming an increasingly important part of our business as demand for glass containers continues to expand" (*CW*, Dec. 9, p. 42).

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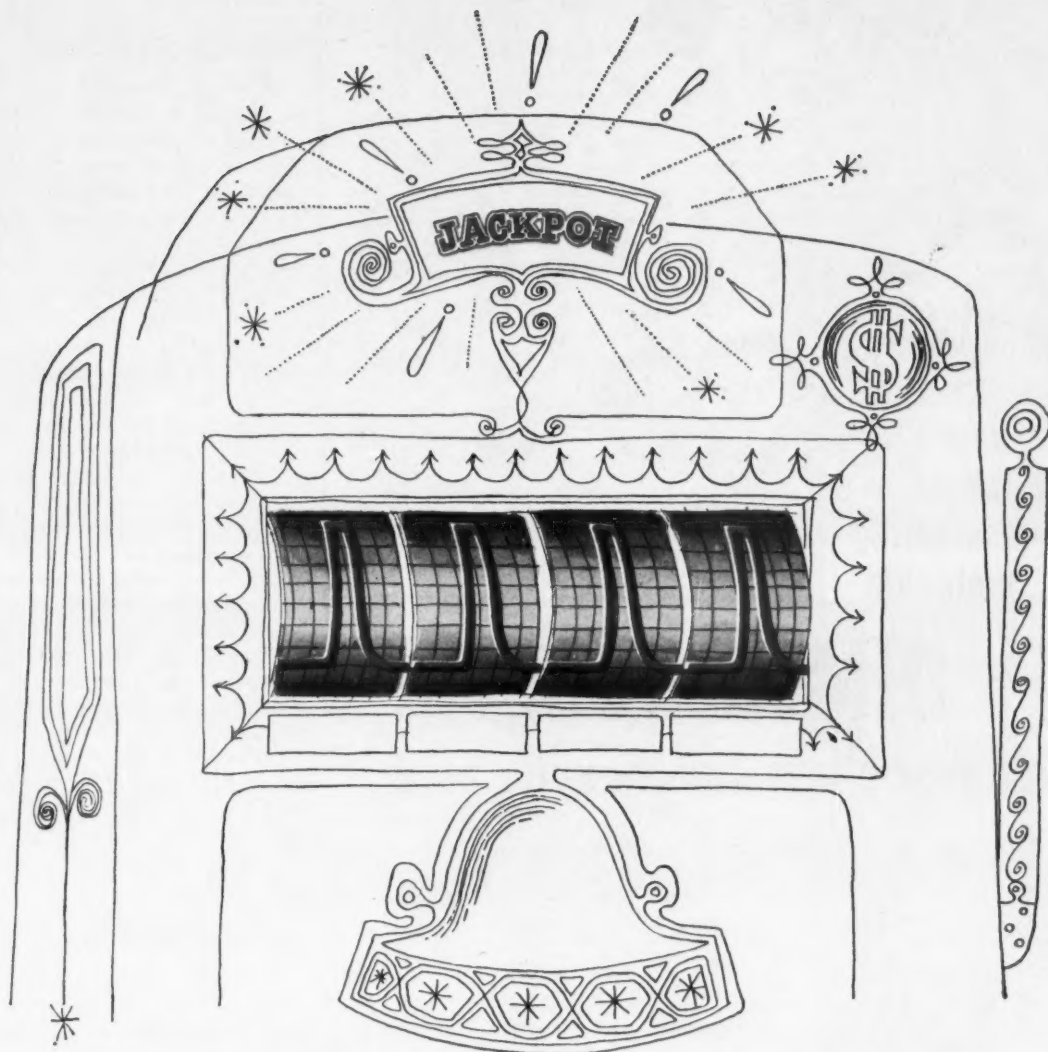
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## With acrylates...purity pays off

Celanese acrylates, made by the beta propiolactone process, provide new high standard of purity

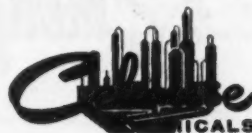
It's a good bet that Celanese acrylates can give you a better finished product. Gas chromatographs demonstrate the unsurpassed purity inherent in this unique Celanese production method. This purity means consistent reaction rates and more complete conversion of monomer to polymer.

You'll finish in the money if you start with Celanese acrylates in the production of paints, paper, leather, textiles, floor polishes, and other polymeric applications. Write for 48-page booklet.

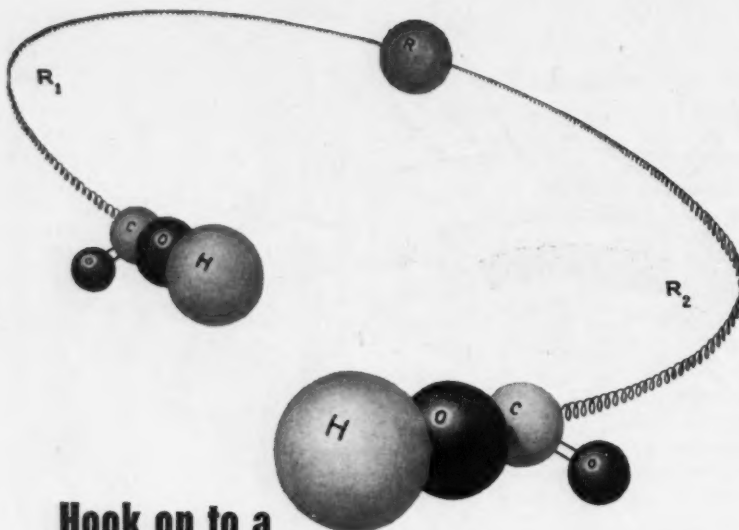
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## DIMER ACID . . . longest chain dicarboxylic acid

Unusual, and often profitable, things happen when you tie into the carboxyl groups at the ends of the long dimer acid chain. And a part of the intrigue of Empol® Dimer Acid lies hidden midway between the carboxyl groups, where the exact nature of the structure has not yet been determined.

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- (1) The chain length between dimer acid's carboxyl groups is approximately 16 carbons long—twice that of the next longest commercially available dicarboxylic acid.
- (2) The 36-carbon structure of dimer acid has a molecular weight of approximately 565 compared to a high of about 300 for other dicarboxylic acids—yet dimer acid is a liquid.
- (3) Commercial grades of dimer acid contain a specified amount of trimer acid, a *tricarboxylic* acid of even higher molecular weight.

Four grades of dimer acid are available from Emery with trimer acid contents ranging from 5% to 25%. (90% trimer acid is also available on a development basis.) Prices are as low as 25¼¢ a pound—well below adipic, azelaic and sebacic acids.

For highly interesting results in polymerization, esterification, hydrogenation, saponification, condensation or what have you, we suggest you investigate Empol Dimer Acids from Emery. Technical literature is available to guide your selection of the best grade for your particular use. And we'll be happy to offer recommendations if you'll outline your specific problems. Just write Dept. I-12B



**ORGANIC CHEMICALS DIVISION**  
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Emery Industries (Canada) Ltd., London, Ontario • Export Division, Cincinnati

### SALES

#### Phosphate Bonus

Canadian Industries Ltd. (Montreal) is the first company to take advantage of the new deep-water dock facilities constructed by the Hamilton (Ont.) Harbor Commission.

The multimillion-dollar port improvement program takes full advantage of the St. Lawrence Seaway—seagoing vessels' cargo may be discharged directly onto the Hamilton docks, eliminating transshipment costs. Prior to port improvement it was necessary to transfer cargo from oceangoing ships to shallow-bottom lake carriers to get it to Hamilton.

Last month's CIL shipment of 12,000 tons of phosphate rock was the first to be made direct to Hamilton on a seagoing vessel. Previously, phosphate was unloaded and stockpiled at Sorel, Que. During summer months it was transhipped in lake carriers for delivery to Hamilton as needed. During the winter, when the lakes were frozen, it was moved to Hamilton by rail.

Now the phosphate can be stockpiled at Hamilton during the summer and trucked to plant when needed. Haulage savings for CIL are about 10%.

#### Fire Under Fire

The chemical industry may come under fire when the Interstate Commerce Commission makes public its findings on the Nov. 21 freight train tragedy at Poca, W.Va.

Chemicals escaping from leaking derailed tank cars set off a series of fires and explosions—a week after the wreck—while workmen were attempting to untangle the piled-up cars. Initial reports indicate that a tank car containing phosphorus under water sprung a leak and the wet phosphorus drained under cars containing acetone and styrene. When it dried, the phosphorus caught fire and exploded, igniting the acetone. This set fire to a car of styrene. Two trainmen were killed in the derailment, but none of the firemen or workers were injured in bringing the fire under control.

The train was moving tank cars of chemicals from the Charleston, W. Va., chemical complex.

The area has been cleared but it will be at least three weeks before transportation is restored to normal.



# TIN CHEMICALS

[illegible]

PVC resins  
Chlorinated  
organics  
Rubber  
Casein  
Hydrogen  
peroxide

*are effective*  
**STABILIZERS**

Fruit flavoring  
Soaps  
Greases  
Chlorinated  
rubber

**Write for our "Bibliography of reported stabilization applications".** Among those mentioned are many which

now account for large tonnage use of tin chemicals. M&T offers a wide range of inorganic and organic tin chemicals in commercial, development, or research quantities. A catalog will be sent with the bibliography. Write to Dept. W.

Sn Sb P Si Ti Zr ORGANOMETALLICS AND INORGANICS

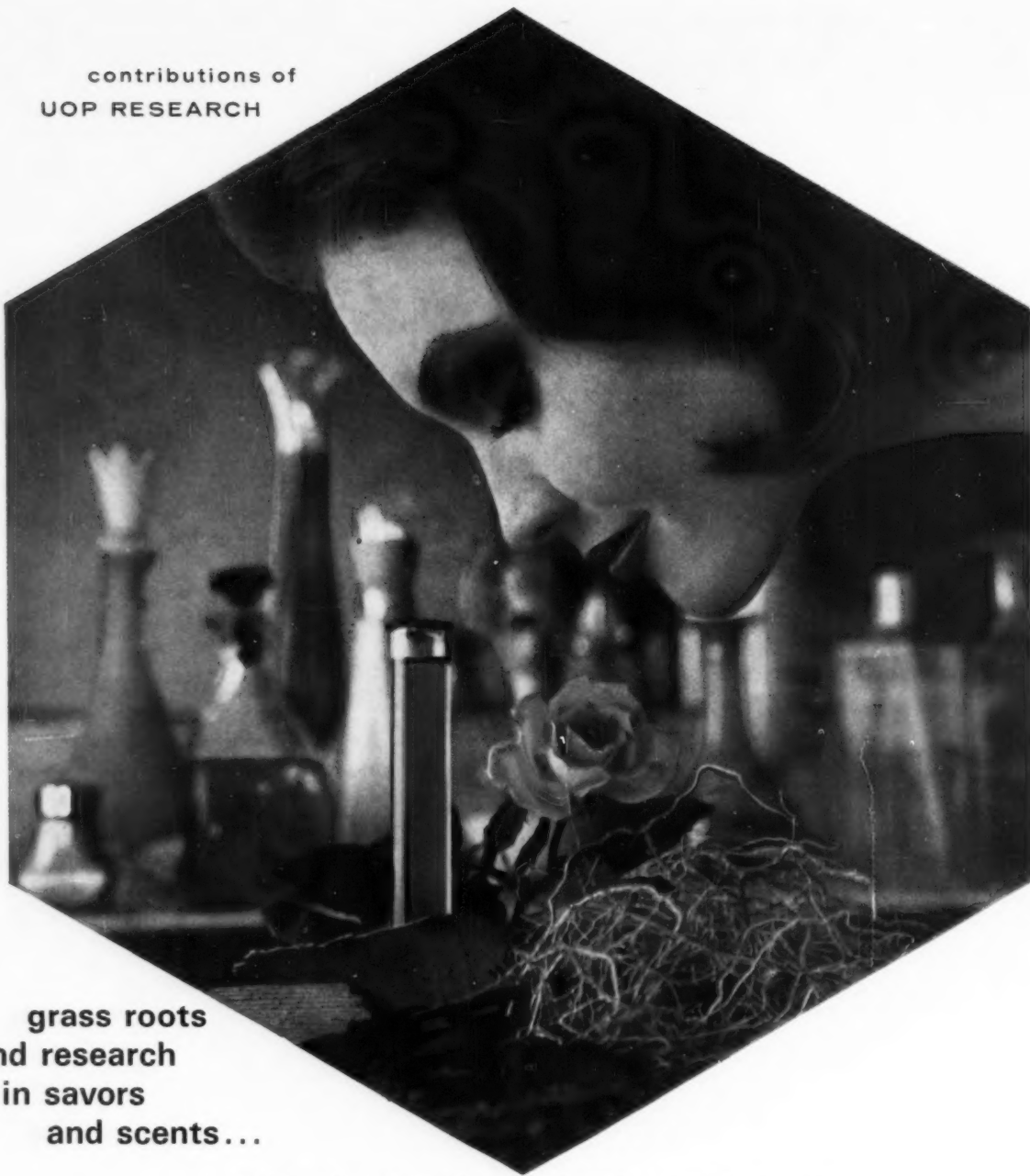


# CHEMICALS

December 16, 1961 CHEMICAL WEEK 43



contributions of  
UOP RESEARCH



grass roots  
and research  
in savors  
and scents...

Today, as in past centuries, the perfumers' art depends on exotics such as grass roots from Haiti... the wood of a Brazilian tree... grasses from Formosa... spice flowers from Madagascar... sawdust from the Mexican juniper... rose petals from France.

The Trubek Laboratories, a UOP subsidiary, conducts basic research in aroma and flavor chemistry. Using both traditional sources and synthetic chemicals from modern research, Trubek provides fragrances, flavors and other fine chemicals that add zest to every hour of your day... in perfumes, soaps, toothpaste, pharmaceuticals, toiletries, and many of the foods on your table.

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**UNIVERSAL OIL PRODUCTS COMPANY** DES PLAINES, ILL., U.S.A.

WHERE RESEARCH IS PLANNED WITH PROGRESS IN MIND



# Washington Newsletter

CHEMICAL WEEK  
December 16, 1961

**Air Force's plans to develop a solid-fueled rocket booster** are taking shape. It would be used for manned space flights. The Air Force will soon call for proposals to build a 120-in. diameter, segmented solid-fueled rocket engine capable of producing slightly over 1-million-lbs. thrust.

The Air Force wants its new solid-fueled rocket booster fully developed and ready for use within the next two and one-half years. Cost for engine development alone will be \$200-300 million.

Requirements for the new booster: it must be versatile enough to be clustered with solid-fueled or liquid-fueled engines, have thrust vector controls, and be capable of varying from three to five segments. A full five-segmented engine will produce the 1-million-pounds-plus thrust.

A crucial top-level decision by the National Aeronautics and Space Administration and the Air Force is expected by early January on a second solid-fueled booster. To be 156 in. in diameter, this booster would be capable of producing 20-million-lbs. thrust as a first stage in a cluster. It would provide a backup booster for NASA's man to-the-moon project Apollo.

•  
**New restrictions on chemical and petroleum truck operations** are proposed in an effort to reduce the toll of grade-crossing accidents. More than 1,200 fatalities have occurred at crossings this year, 22% of them as a result of truck-train collisions. Ernest G. Cox, chief of Interstate Commerce Commission's Motor Carrier Safety Division, recommends:

- (1) Extension of the full-stop requirement, now covering trucks carrying explosive substances or flammable liquids, to those laden with commodities having "a particular fire hazard" and to all trucks of 26,000 lbs. gross weight or more.
- (2) Creation of a government-industry advisory group to recommend closing more dangerous crossings to heavily loaded vehicles and the use of special protection devices at others.

•  
**The spectacular rise in prices of tantalum scrap and ore** is about at an end, say government experts. Price of tantalum—used in electronics for capacitors and in metallurgy as a high-temperature alloying material—just about doubled in the past couple of months. Chief reason: Imports from the Congo were 31,720 lbs./month until trouble hit that country. Now they are down to about 1,900 lbs./month.

However, new sources of supply are opening rapidly—in Brazil, Mozambique and Malaya. And new techniques are being developed to economically process low-grade ores into useful metal. Government experts feel that prices may well drop back to their normal levels of \$7-8.50/lb. within six months or so.



## Washington

### Newsletter

(Continued)

Continuation of the Army's food irradiation program will be recommended in a report due next month. The independent study was undertaken by a group of scientists from Johns Hopkins Operations Research Office more than a year ago, when considerable skepticism was being expressed. The group finds that the research program is valid and should not be changed.

The \$7-million, six-year program of the Army Quartermaster Corps now is in its second year. The study finds excellent results achieved to date in the irradiation of bacon, beef, chicken and some pork products, and that bad taste effects have been eliminated in many cases.

•  
Thiokol Chemical was the industry's top defense contractor in fiscal '61 (ended last June 30). The company was awarded \$210 million in new orders (compared with \$131 million in fiscal '60) and ranked 24th on the Defense Dept.'s latest roster of the 100 leading defense contractors. Other chemical companies on the list: Hercules Powder, 32nd, with \$117-million worth of contracts; Olin Mathieson, 59th, \$52.5 million; Du Pont, 66th, \$41.1 million (including \$34 million to Du Pont's subsidiary, Remington Arms).

On the list also, of course, are a large number of other firms with chemical interests. Leader, as it has been in four of the past five years, is General Dynamics, with \$1.9 billion in new orders. Next four: North American Aviation, Lockheed Aircraft, Boeing, General Electric.

•  
Backstage maneuvering at the AFL-CIO convention in Miami is of key interest to CPI management and its future dealings with organized labor.

On the surface, all is as sunny as the weather. But behind the scenes: (1) rivalry within the AFL-CIO has become bitter, particularly between the craft and industrial unions, and (2) union leaders are more than a little disenchanted with the Kennedy Administration.

These two developments are likely to make organized labor more aggressive than ever in '62. Union leaders are particularly upset by the Administration's drive to restrict wage gains to productivity rises. They also feel that employers, with the tacit aid of the White House, may make major strides next year in their campaign to place unions under the antitrust laws.

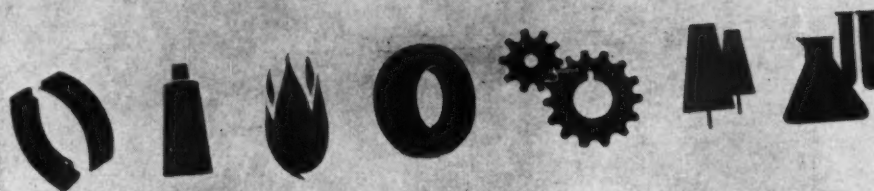
Much of the union's aggressiveness thus will be defensive. Knowing that they cannot get major wage increases, they will intensify their drive for a shorter work week. But this too will run into White House opposition.


Another case in point: AFL-CIO President George Meany and a half dozen key union officials are just about ready to write off the President's tripartite labor-management committee as a failure. They fear it is being used as a vehicle to cause them to restrain their bargaining efforts, settle for modest goals.



# AMBIFLO

*fluids and lubricants*



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Ambiflo is the trademark for Dow polyalkylene glycol mono and diethers, which are now commercially available. The properties and uses of these Ambiflo products are discussed in a new booklet. For your copy, write The Dow Chemical Company, Abbott Road Building, Midland, Mich. Attn: TS&D.

THE DOW CHEMICAL COMPANY



Midland, Michigan



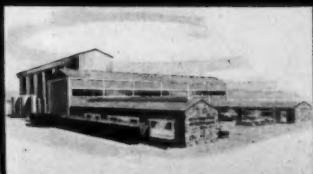


**U.S.A.** — World's largest wax manufacturing plant, built at the Philadelphia refinery of Atlantic Refining Company.



**Belgium** — Phthalic anhydride plant for Union Chimique Belge S.A., Brussels.





**Mexico** — Citric acid plant for Quimica Mexama S.A. Drawing includes proposed future expansion.



**Holland** — Complete 100,000 bpsd "grass roots" refinery constructed for Esso Nederland in the vicinity of Rotterdam.



**Taiwan** — 600 bpsd sulfuric acid alkyl plant for Chinese Petroleum Corp., Kaohsiung.



**Spain** — Fractionation unit for Empresa Nacional Calvo Sotelo.

## money-making plants at home or abroad built by BADGER

Chemical and petroleum producers in search of international profits are turning their engineering and construction projects over to Badger in growing numbers. To date, Badger has helped clients make their money talk in thirteen languages.

How do you benefit by working with Badger overseas? You work with people who know local conditions, your problems, their jobs. Affiliate staffs — on the spot in seven countries — include top talent of the locale combined with seasoned Badger career personnel. And you deal in indigenous currencies.

When you are considering a money-making plant anywhere abroad, ask Badger for help. The full story on facilities and services is as close as the nearest office — write, wire or phone.

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# THE LITHIUM REACTOR

CURRENT INFORMATION ON LITHIUM CHEMISTRY AND METALLURGY

## LITHIUM IN BRIEF

*New developments involving lithium are constantly appearing in the literature. Each month some will be repeated here.*

A recent government report describes the use of anhydrous lithium hydroxide as a carbon dioxide absorbent for the purification of air in personnel shelters (6792).

Details are given for construction of a simple die for use in extruding fine lithium wire down to a diameter of 1 mil (6793).

A process for the manufacture of diphenyl-piperidyl carbinols is described in a recent patent. For example, phenyllithium is reacted with a lower alkyl ester of N-acyl-piperidine-4-carboxylic acid, and the resulting product hydrolyzed to form diphenyl piperidyl-4-carbinol (6884).

Infrared spectra of methylolithium, ethyllithium and phenyllithium in the region 300-4000  $\text{cm}^{-1}$  were investigated and the significance of the bands found is discussed (6942).

The heats of reaction of *n*-butyllithium with steam and with  $\alpha$ -bromotoluene were measured calorimetrically and the heat of formation of *n*-butyllithium was calculated (7028).

Lithium hydroxide was found to be a superior additive for reducing the dilatancy of clay slurries, in dosages of 0.05 to 0.2% based on the dry clay. Unlike sodium or barium hydroxides, it is also effective on clay minerals other than kaolinite (6646).

Lithium and styrene,  $\alpha$ -styrene, butadiene and isoprene react in the presence of methyl and methylmethoxy chlorosilanes to give various organosilicons. THF, ether, or benzene may be used as the solvent (6832).

The action of isopropyllithium, tertiarybutyllithium and tertiaryamyllithium on esters (ethyl caprylate) at  $-35^{\circ}\text{C}$  yields mostly tertiary-alcohols, while at  $+35^{\circ}\text{C}$  the products are symmetrical ketones obtained by abnormal reaction (7012).

A new method for the preparation of triarylamines by the reaction of N-dia-

## Lithium Hydroxide Proves Effective Air Purifier In Fall-Out Shelter

Recent thinking strongly suggests that if fall-out shelters are to be truly effective in safeguarding citizens in any future emergency, they will have to be equipped with more than food, water and the conventional necessities of life.

A primary concern will be some means of removing carbon dioxide from the air within the shelter on a continuous basis. It has been estimated that shelters may have to be sealed against air- and rain-borne radioactivity for as much as two or three days after an atomic explosion. Under such circumstances, death from an excess of carbon dioxide could occur long before an oxygen deficiency became apparent.

### Absorption-Grade Lithium Hydroxide Supplies Solution

Lithium hydroxide is recognized as an effective means of combatting this danger. Of all the alkali-metal hydroxides, it is by far the most efficient absorbent of carbon dioxide on a pound-for-pound basis. A special absorbent grade of anhydrous lithium hydroxide is used, produced in the form of hard, porous dust-free granules capable of absorbing optimum quantities of carbon dioxide.

### Shelter-Tested

Recently, two men spent several days in a sealed underground fall-out shelter equipped with a lithium hydroxide purification system used in conjunction with an auxiliary source of breathable oxygen. They reported completely satisfactory results with no signs of discomfort from carbon dioxide buildup.

Absorption grade lithium hydroxide is available from LCA in limited quantities to meet the needs of manufacturers who are producing fall-out shelters or shelter components for home or industrial use. Requests for further information should be addressed to the Company's offices at 500 Fifth Avenue, New York 36, New York.

rylamine-lithium compounds with aryl iodides in the presence of cuprous iodide as catalyst is described. The diarylamine-lithium compounds are obtained from phenyllithium and amines. The lithium compounds of bis-(*p*-dimethylaminophenyl)-amine, diphenylamine, and carbazole were prepared and used (7066).

The relative initiating ability of five organolithiums were determined at low monomer: catalyst ratios with styrene as monomer. Tabulated data show that butyllithium is much more reactive than benzylolithium and allyllithium, which are more reactive than vinylolithium or phenyllithium (7029).

A recent patent covers a lithium, barium, calcium alloy hydrofuel composition with a melting point below  $270^{\circ}\text{F}$  (6845).

For further information, write our Technical Service Dept., Bessemer City, N. C.

## NEWLY AVAILABLE ORGANOLITHIUM COMPOUNDS

Workers in the field of organic chemistry will be interested to note recent additions to the group of organolithium compounds that are now available from LCA.

To the previous list—*n*-butyllithium, *sec*-butyllithium and 2,6-dimethoxyphenyllithium—have now been added *tert*-butyllithium and phenyllithium, available presently only in research quantities of  $\frac{1}{4}$  lb. *t*-Butyllithium is offered as a 1.5-to 2-molar solution in pentane. Phenyllithium is available as an approximately 2-molar solution in benzene-ether.

In addition to the compounds mentioned, others are obtainable on a custom basis. Those interested are invited to write to the Company's Technical Service Division, Bessemer City, N. C.

LITHIUM CORPORATION OF AMERICA, INC.

500 FIFTH AVENUE • NEW YORK 36, N. Y.

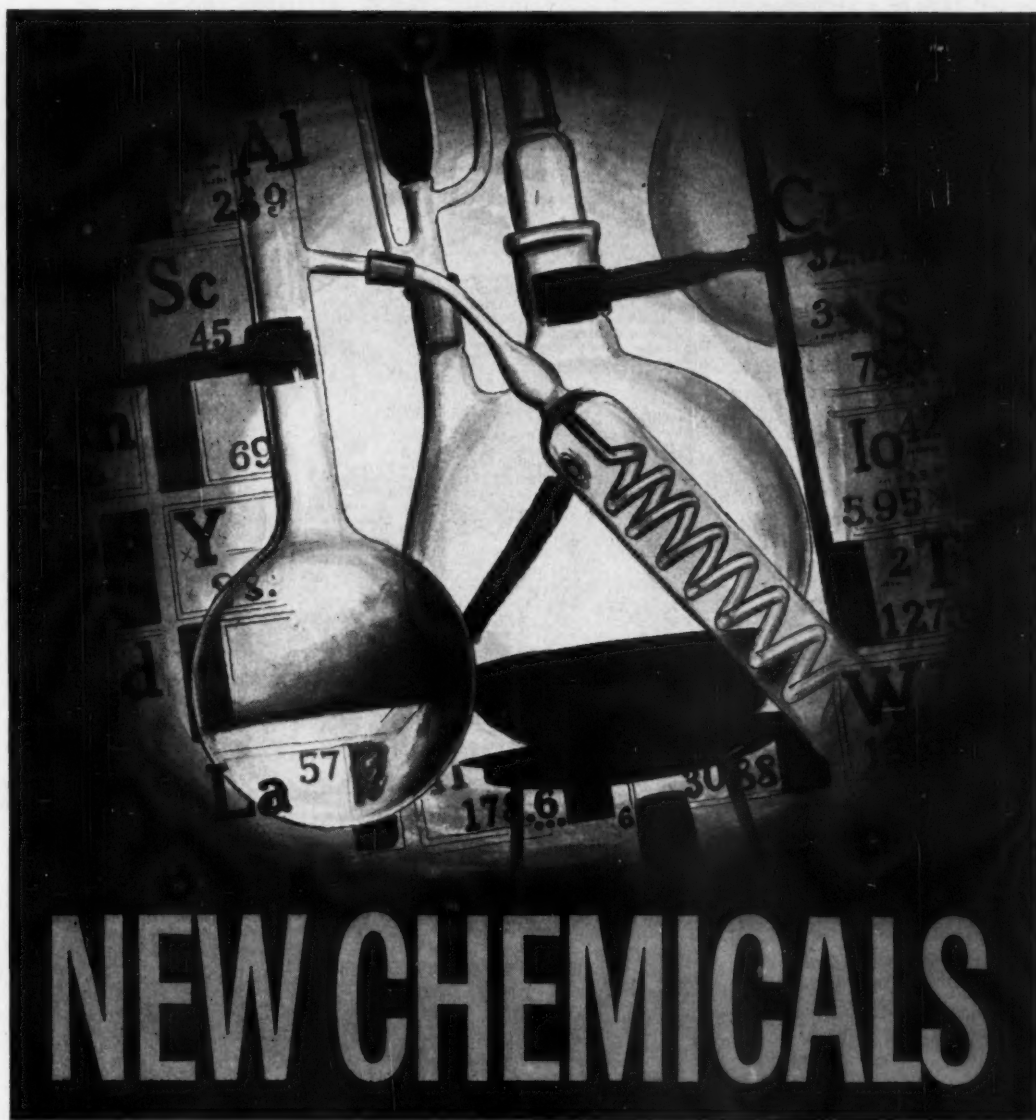
NEW YORK 36, N. Y. • CLEVELAND 14, OHIO • CHICAGO 1, ILL. • LOS ANGELES 36, CALIF. • BESSEMER CITY, N. C.

50 CHEMICAL WEEK December 16, 1961



## CHEMICAL WEEK REPORT

Here's CW's annual new-chemicals survey—461 products that are new to the market or available in new grades or larger quantities.



# NEW CHEMICALS FOR INDUSTRY

This year CHEMICAL WEEK's survey of the chemical industry turned up 461 new products, close to the tally of the peak years of '57 (483) and '60 (496).

Not as readily evident are certain statistics that indicate how the main stream of new product development and marketing is flowing.

About 65% of the items were reported because they were considered by producers to be

"new chemical products," 20% because they are "significant new grades" and 15% because of increased availability. Clearly, prime emphasis is on introduction of new materials rather than upgrading of older products—a good omen for the industry's health.

Fifty-four percent of all "new" products became immediately available in commercial quantities, 21% were introduced on a laboratory



# NEW CHEMICALS FOR INDUSTRY

scale, and 25% on a semicommercial scale.

**Buckshot Marketing:** The reported chemicals are, of course, aimed at a broad spectrum of potential uses. But about 20% either carry no specific applications suggestions or are merely identified as "intermediates" for general chemical synthesis.

This vagueness about specific end-uses seems at variance with current strong emphasis on tailoring of new products to consumer needs through market research.

Such bazaar-type marketing was more common in past years, before the advent of sophisticated market research.

Also apparent is the other extreme: the producer indicating such a diversity of applications that the new product seems to be an elixir to cure all synthesis and formulation problems.

**End-Use Emphasis:** Prime emphasis among new chemicals is on plastics. At least 45 products are described as resins in themselves, or as adjuncts for the formulation of resin products. This does not include an additional 23 items listed as plasticizers.

Textile specialty chemicals comprise the next largest category (about 31 items), which includes materials such as antistatics and various other finishing agents. More than 20 items are tabbed for use in dye manufacture and about an equal number are aimed at pharmaceutical uses.

Breakdown of other items by end-use: 13 catalysts, 12 paint chemicals, 12 metals industry chemicals, 11 laboratory reagents, 10 miscellaneous stabilizers, 9 paper chemicals, 10 pesticides, 9 solvents, 12 lubricants, 8 adhesives, 8 anti-oxidants, 7 miscellaneous coatings materials, 7 emulsifiers, 7 sequestering agents, 6 ultraviolet absorbers, 5 miscellaneous.

This year's crop of new products once again affirms the willingness of chemical makers to generously support research—despite an overcast profit picture. So long as this view prevails, the CPI can expect to see its basket of new raw materials, intermediates and finished products filled to the brim each year for a long time to come.

## NEW CHEMICALS

### ACETOACET-2,5-DIMETHOXY-4-CHLOROANILINE

$C_{12}H_{11}ClNO_4$ ; MW, 271.8; MP, 101-103 C; Solubility, in acetone and xylene, insoluble in water; light gray powder. Suggested uses: dye intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. Pfister Chemical Works.

### AMBER CTPH (enzyme hydrolyzed cottonseed protein)

Constituents: total nitrogen 8.6%, amino nitrogen as % of total nitrogen 31.0%. Purity, technical; dry powder. Suggested uses: fermentation nutrient. Introduced as: significantly new grade. Availability: commercial quantities. Amber Laboratories, Inc.

### AMBER MPH (enzyme hydrolyzed meat protein)

Constituents: total nitrogen 13.8%, amino nitrogen as % of total nitrogen 20.0%. Purity, technical; tan powder. Chemical properties: fermentation nutrient amino acid source, chemical intermediate. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Amber Laboratories, Inc.

### 2-AMINO-5-CHLOROTOLUENE

$C_7H_6ClN$ ; MW, 141.6; Congealing P, 26.0-27.0 C; Purity, 99.0%; Solubility, in dilute acids, sparingly in water; crystalline fused, grayish-white. Chemical properties: toxic; skin contact and inhalation must be avoided. Suggested uses: as an intermediate for dyes and other organic chemicals. Introduced as: significantly new grade. Availability: commercial quantities. Pfister Chemical Works.

### 3-AMINO-4-METHOXYBENZANILIDE

$C_{14}H_{14}N_2O_2$ ; MW, 242.28; MP, 149-151 C; Purity, 98.3% min; gray powder. Suggested uses: in dyes, pharmaceuticals and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

### p-AMINOTHIOANISOLE

$C_7H_9NS$ ; MW, 139.2; BP, 115-117 C @ 1 mm; Suggested uses: pharmaceutical intermediate. Introduced as: new chemical product. Availability: commercial quantities. Evans Chemetics, Inc., Technical Div.

### AMMONIUM ACETATE 60%

$NH_4C_2H_3O_2$ ; Constituents: 60% w/w ammonium acetate sol. MW, 77.08 anhydrous; SpG, 1.090-1.110; % Active, 60; pH, 7-7.5; Water content, 40% max; Purity, 60% min ammonium acetate; clear and colorless; APHA, 10 max. Suggested uses: preserving meats, dyeing, stripping, A.R., etc. Introduced as: significantly new grade. Availability: commercial quantities. Washine Chemical Corp.

### AMMONIUM FORMATE 50%

$HCOONH_4$ ; Constituents: 50% w/w ammonium formate, 50% water. MW, 63.06 anhydrous; SpG, 1.20; % Active, 50; pH, 7.2-7.6; Water content, 50% max; Purity, 50% min  $HCOONH_4$ ; APHA 5. Chemical properties: same as ammonium formate anhydrous; stable soln. Suggested uses: same as dry ammonium formate. Introduced as: product with new degree of availability. Availability: commercial quantities. Washine Chemical Corp.

### AMMONIUM STEARATE ANHYDROUS

MW, approx. 290; SpG, approx. bulk 30 lb/cu ft; pH, slightly alkaline; Purity, commercial; Solubility, in hot water, alcohol, petroleum solvents; white, coarse powder; approx 100% through 50 mesh; approx 50% through 100 mesh. Chemical properties: stable in closed containers; contains no excess ammonia. Suggested uses: viscosity modifier in clay-starch paper coating formulation; water repellent

agent in textiles, paper and portland cements; where water-soluble soaps are applicable. Introduced as: product with new degree of availability. Availability: commercial quantities. Mallinckrodt Chemical Works, Industrial Div.

### 3-AZABICYCLO(3,2,2)NONANE

$C_8H_{15}N$ ; MW, 125.1; MP, approx 180 C (sublimes); BP, approx 180 C @ 760 mm (sublimes); Flash P, 100 F (C.O.C.); Purity, 98%; Solubility, 58% in water, 47% water in, miscible in ethanol, 53% in ether, 34% in acetone, 47% in benzene; white solid. Chemical properties: reactive secondary amine; sublimes readily at room temperature and atmospheric pressure. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### BARIUM THIOSULFATE MONOHYDRATE

$BaSO_3 \cdot H_2O$ ; Purity: primary standard grade; white crystalline solid. Suggested uses: primary standard for iodometric analysis. Introduced as: new chemical product. Availability: laboratory quantities. G. Fred'k Smith Chemical Co.

### BATHOCUPROINE, SULFONATED, SODIUM SALT (disodium 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline disulfonate)

$C_{26}H_{18}N_2S_2O_6Na_2$ ; Purity, reagent grade; Solubility, in water; white, crystalline solid. Suggested uses: exceptionally sensitive colorimetric reagent for copper. Introduced as: new chemical product. Availability: laboratory quantities. G. Fred'k Smith Chemical Co.

### BORON FLUORIDE-PHOSPHORIC ACID 100%

$BF_3 \cdot H_3PO_4$ ; MW, 165.824; SpG, 1.93; MP, ca-105 C; % Active, 100. Chemical properties: strong Lewis acid. Suggested uses: catalyst for alkylations and polymerization reactions. Introduced as: product with new degree of availability. Availability: commercial quantities. Harshaw Chem. Co., Inorganic Div.

### BORON TRIFLUORIDE TRIBUTYLAMINE COMPLEX

$BF_3 \cdot N(C_4H_9)_3$ ; MW, 253.16; SpG, 1.0; MP, 42-44 C; pH, (5% slurry) 5.1; Water content, probably <1%; Purity, 96.6%; Solubility, in acetone, chloroform and dioxan; slightly soluble in petroleum ether; insoluble in cold water; light brown, waxy lumps. Chemical properties: decomposes in hot water and on standing in air. Suggested uses: controlled source of  $BF_3$ . Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp., General Chemical Div.

### 2-BROMOBUTYRIC ACID

$C_4H_7BrCOOH$ ; MW, 167.0; SpG, 1.567 @ 20/20 C; BP, 121-123 C at 24 mm Hg; Purity, 97.0; Solubility, 6 g/100g water; colorless liquid. Suggested uses: intermediate for the production of amino acids and hormones; fungicide and germicide; heat stabilizer for photographic film supports. Introduced as: new chemical product. Availability: commercial quantities. Michigan Chemical Corp.

### p-BROMOTHIOANISOLE

$C_7H_7BrS$ ; MW, 203; MP, 38-39 C; Purity, 98% min. Suggested uses: pharmaceutical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Evans Chemetics, Inc., Technical Div.

### 2-BUTANOL

$CH_3CH_2CH(CH_3)OH$ ; MW, 74.12; SpG, 0.8075 @ 20/20 C; BP, 99.50 C @ 760 mm Hg; Flash P, 74 F; RI, 1.3969 @ n 20/D; Viscosity, 3.8 cps @ 20 C; Purity, 100%; Wt% in water, 18.2 @ 20 C; Acidity, wt% 0.005; Distillation, IBF 97 C @ 760 mm Hg; DP, 102 C; Suspended matter, substantially free; Vapor pressure, 12.47 @ 20 C; Pt-Co, 15,



Suggested uses: solvent for protective coatings, dyes, inks, specialty applications; intermediate for plasticizers, weed killers, surfactants, ore collectors, lube oil additives. Introduced as: new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

### BUTENEDIOL (2-butene-1,4-diol)

$C_4H_8O_2$ ; SpG, 1.067-1.074; BP, 141-149 C @ 20 mm Hg; Flash P, 263 F; RI, 1.475-1.477; Solidification P, 7.0 C; % Active, approx 90 (predominantly the *cis* isomer); Viscosity, 22 cps @ 20 C; Solubility, in water, methanol, ethanol, and acetone; clear amber liquid. Suggested uses: intermediate for amines, Diels-Alder adducts, epoxides, esters, ethers, halides, and nitriles; brightening agent in nickel electroplating; reducing agent in chrome tanning baths for leather. Introduced as: product with new degree of availability. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

### t-BUTYL ACETYLENE (3,3-dimethyl-1-butyne)

$C_6H_{10}$ ; BP, 38 C; Purity, 97-98%; water white liquid. Suggested uses: organic research and synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Farchan Research Labs.

### t-BUTYLAMINOETHYL METHACRYLATE (TBAEMA)

$C_{10}H_{19}NO_2$ ; Formula wt, 185; SpG, 0.9137 @ 25/4 C; Freezing Pt, <-70 C; Inhibitor 0.1% MEHQ; Density, 0.933 @ 25 C; B Range, 100-105 C @ 12 mm Hg; Flash P, 205 F (C.O.C.); RI, 1.4395 n 25/D; Viscosity, 2.11 cs @ 38 C; Solubility, in water 1.8/100 @ 25 C, and in organic solvent; but hydrolyzes slowly; clear, mobile liquid, 50 max (APHA). Suggested uses: in copolymers for improving dye receptivity and adhesion to certain substrates; as a cationic polyelectrolyte, the polymerized hydrochloride may be used as an anti-static agent or as an agent in agglomerating soil. Introduced as: product with new degree of availability. Availability: commercial quantities. Rohm & Haas Co., Special Products Dept.

### 2-BUTYL CHLORIDE

$C_2H_5CHClCH_3$ ; MW, 92.57; SpG, 0.8745 @ 20/20 C; Freezing P, -130.3 C; BP, 68.25 C @ 760 mm Hg; Flash P, <7 C (O.C.); RI, 1.3971 @ n 20/D; Purity, 100%; Chemical properties: stable, water-insoluble liquid. Suggested uses: solvent for oils, fats, waxes, greases, gums, resins; extractant as dewaxing agent and cleaning compound; intermediate for pharmaceuticals, plasticizers, insecticides, polysulfide rubbers, resins, cationic surfactants. Introduced as: new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

### t-BUTYLDIETHANOLAMINE (TBDA) [2,2'-(t-butylimino)diethanol]

$C_8H_{19}NO_2$ ; Formula wt, 161; SpG, 0.985 @ 25 C; MP, 47-48 C; B Range, 165-170 C @ 33 mm Hg; 124-126 C @ 5 mm Hg; Flash P, 285 F (C.O.C.); RI, 1.4648 @ 28 C; Solubility, in water; ethanol, carbon tetrachloride and benzene; insoluble in petroleum, ether, n-heptane; white to light amber solid; very faint amine odor. Suggested uses: in preparation of polyesters or polyethers, fibers, flexible or rigid foams; improved dye receptivity and adhesion to structural substrates; intermediate for preparation of textile additives, dyestuffs, insecticides, germicides and surface-active agents; catalyst for epoxy resins. Introduced as: new chemical product. Availability: developmental quantities. Rohm & Haas Co., Special Products Dept.

### 1,3-BUTYLENE GLYCOL (1,3-butanediol)

$C_4H_{10}O_2$ ; MW, calc, 90.12; SpG, 1.004-1.006; Freezing P, <-50 C; BP, 207.5 C; Flash P, 250 F; RI, 1.4401; Viscosity, 65 cps @ 25 C; Water content, Wt %, max 0.5; Purity, Wt %, min 99; Solubility, in water and many non-hydrocarbon solvents; platinum-cobalt units, max=10; distillation range, 200-215; acid, as

acetic, 0.005 Wt %; autoignition temperature,  $F=945$ . Chemical properties: highly purified grade; hygroscopic; 1,3-diol configuration. Suggested uses: in making polyesters, urethane coatings, polymeric plasticizers, and directly as humectant and as coupling agent. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Celanese Chemical Co.

### 2-BUTYL-2-ETHYL-5-METHYL-3,4-HEXADIENAL

$C_{13}H_{22}O$ ; MW, 194.3; SpG, 0.859 @ 20/20 C; BP, 78 C @ 1.0 mm; Flash P, 198 F (C.O.C.); RI, 1.4646 @ 20/D; Purity, 95%; Solubility, miscible with benzene, acetone, naphtha, methyl alcohol; colorless liquid. Chemical properties: those of the reactive aldehyde and allene groups. Suggested uses: chemical intermediate in preparation of insecticides, pharmaceuticals and perfume ingredients. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### n-BUTYLLITHIUM

$C_4H_9Li$ ; MW, 64.06; colorless to light yellow; available for first time in solid wax dispersion—or as pure chemical, without solvent. Suggested uses: catalyst for stereospecific polymerization of isoprene and butadiene and for low-pressure polymerization of ethylene; halogen metal interconversions; general synthesis for attachment of butyl group. Introduced as: significantly new grade. Availability: semicommercial quantities. Lithium Corp. of America.

### sec-BUTYLLITHIUM

$C_4H_9Li$ ; Constituents: in heptane solution. MW, 64.06; Density of soln, 0.7 gm/cc; colorless to light yellow soln. Suggested uses: catalyst for polymerization reactions; for halogen metal interconversions; general synthesis for attachment of butyl group. Introduced as: new chemical product. Availability: commercial quantities. Lithium Corp. of America.

### tert-BUTYLLITHIUM

$C_4H_9Li$ ; MW, 64.06; Density of sol, 0.7 gm/cc; colorless to light yellow heptane solution. Suggested uses: catalyst for polymerization reactions; for halogen metal interconversions; general synthesis for attachment of butyl group. Introduced as: new chemical product. Availability: laboratory quantities. Lithium Corp. of America.

### sec-BUTYL MERCAPTAN (butanthiol-2)

$C_4H_9S$ ; MW, 90.2; SpG, 0.829 @ 15.5/15.5 C; BP, 83-88 C; water white liquid. Suggested uses: chemical intermediate. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Industrial Div.

### CADMIUM NITRATE PURIFIED FLAKE

$Cd(NO_3)_2 \cdot 4H_2O$ ; MW, 308.49; Water content, 4%; Purity, 98.5% min assay; white flake. Chemical properties: readily soluble. Suggested uses: battery application, catalyst. Introduced as: product with new degree of availability. Availability: commercial quantities. J. T. Baker Chemical Co.

### CALCIUM LAURATE (calcium dodecandate)

$Ca(C_{12}H_{23}O_2)_2 \cdot 2H_2O$ . MW, 456.7; Solubility, insoluble in water; white granular fatty powder. Suggested uses: waterproofing, tablet coating, as release agent. Introduced as: new chemical product. Availability: semicommercial quantities. City Chemical Corp.

### CALCIUM STEARATE CERTIFIED BULKY A

MW, approx 310; approx bulk, 8 lb/cu ft; Softening range, 155 C; Water content, approx 3.0; Purity, food grade, heavy metals particularly controlled; Solubility, insoluble in water, alcohol, and ether; fine, white, bulky powder; produced from fatty acids certified to be from edible fats and oils, free from chick edema factor; especially manufactured for use where an approved food additive is required. Suggested uses: in molded plastics, resin films and laminates, rubber, and industrial lubricants and water repellent applications. Introduced as: significantly new grade. Availability: commercial quantities. Mallinckrodt Chemical Works, Industrial Div.

### CARBON 53R

SpG, 1.6; pH, 9.0; Purity, 99+; black pellets. Suggested uses: plastic polymers, rubber and metallurgical. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Ammonia Div.

### CELANESE ACETAL DCPE (DICROTONYLIDENE PENTAERYTHRITOL) [3,9-dipropenylspirobi(m-dioxane) and 5-ethyl-5-hydroxymethyl-2-propenyl(m-dioxane)]

$C_{13}H_{20}O_4$ ; MW, 240.3; Density, 1.07 g/ml @ 20 C; Freezing P, 50-55 C; BP, 185-189 C @ 20 mm Hg abs; white waxy solid; Unsaturation, as per cent of theoretical, 98-99%. Chemical properties: lends thermal stability to polymers. Suggested uses: copolymers with hydroxy compounds useful as coating and casting resins. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Celanese Chemical Co.

### CELANESE ACETAL MCTMP (MONOCROTONYLIDENE TRIMETHYLOLPROPANE)

[5-ethyl-5-hydroxymethyl-2-propenyl(m-dioxane)]

$C_{10}H_{18}O_3$ ; MW, 186.1; Density, 1.05 g/ml @ 20 C; Freezing P, -35 C; BP, 274 C @ 760 mm Hg abs; water white liquid. Chemical properties: contains both unsaturation and hydroxyl group, making versatile polymers possible. Suggested uses: copolymers useful as coating and casting resins; component of glass reinforced resin structures. Introduced as: new chemical product. Availability: semicommercial quantities. Celanese Chemical Co.

### CESIUM PERCHLORATE

$CsClO_4$ ; Purity: reagent grade; white, crystalline solid. Introduced as: new chemical product. Availability: laboratory quantities. G. Fred'k Smith Chemical Co.

### $\alpha$ -CHLOROACETAMIDE

$C_2H_4NOCl$ . MW, 93.52; MP, 117-119 C; Water content, 1% max; Purity, 98.5% min; Solubility, in water and alcohol, insoluble in ether; colorless to pale yellow crystals; ash, 0.2% max. Chemical properties: contains reactive chlorine atom, amino hydrogen atoms, methylene hydrogen atoms, reactive carbonyl group. Suggested uses: intermediate for pharmaceuticals; preservative for adhesives and resins; organic syntheses. Introduced as: product with new degree of availability. Availability: commercial quantities. Aceto Chemical Co.

### CHLOROACETYL CATECHOL (2-chloro-3',4'-dihydroxyacetophenone)

$C_8H_7ClO_3$ . MW, 186.61; MP, 176-179 C; % Active, 100; Solubility, in hot water, ethanol; less soluble in ethyl ether, benzene, carbon disulfide; slightly soluble in cold water; light tan crystals. Chemical properties: contains a reactive halogen; reacts with many amines; contains two reactive hydroxyl groups which may be acetylated, alkylated, etc. Suggested uses: intermediate for pharmaceuticals. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Company, Inc., Chemicals & Dyestuffs Div.

### p-CHLOROBENZYL MERCAPTAN

$C_7H_7SCL$ . MW, 158.5; MP, 19 C; BP, 122-123 C @ 13 mm; RI, 1.587; Purity, >95% Solubility, in benzene, ethanol, acetone; water white liquid. Chemical properties: typical mercaptan properties. Suggested uses: intermediate; modifier. Introduced as: new chemical product. Availability: laboratory quantities. Hooker Chemical Corp., Product Development.

### 3-CHLORO-2-BUTENE-1-OL

$C_4H_7OCl$ . BP, 69-70 C @ 10 mm; water white to light straw color. Chemical properties: three reactive centers for varied synthesis routes. Suggested uses: in synthetic organic chemistry. Introduced as: new chemical product. Availability: laboratory quantities. Farchan Research Labs.



# NEW CHEMICALS FOR INDUSTRY

## 5-CHLOROSALICYLANILIDE

$C_{12}H_{10}ClNO_2$ . MW, 247.69; MP, 209-211 C; Purity, 99% min; Solubility, in alcohol, ether, chloroform and benzene; slightly soluble in water; white powder. Suggested uses: anti-mildew agent; fungicide; in pharmaceutical preparations and dye intermediates. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## 5-CHLOROSALICYLIC ACID

$C_7H_5ClO_3$ . MW, 172.57; MP, 174-176 C; Purity, 99% min; Solubility, in alcohol, ether, benzene, chloroform, acetic acid; white crystalline powder. Suggested uses: in moth-proofing, insecticides, bactericides, pharmaceutical and dye intermediates. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## COBALT NITRATE PURIFIED FLAKE

$Co(NO_3)_2 \cdot 6H_2O$ . MW, 291.052; pH, 4.0-6.0, 5% sol @ 25 C; Water content, 6%; Purity, 99% min assay; white. Chemical properties: readily soluble. Suggested uses: battery applications, catalyst. Introduced as: product with new degree of availability. Availability: commercial quantities. J. T. Baker Chemical Co.

## COLLOIDAL ZIRCONIA SUSPENSION

$ZrO_2 \cdot X H_2O$ . SpG, 20% slurry 1.22; pH, 0.5-1.0; Water content, 80%; milky white, aqueous slurry. Suggested uses: binder for refractories and in high density refractories. Introduced as: new chemical product. Availability: laboratory quantities. National Lead Co., Titanium Alloy Mfg. Div.

## 635 COUMARONE

(6-hydroxy-5-isopropenyl-3-methyl-coumarone)

$C_{12}H_{14}O_2$ . MW, 190.0; MP, ca. 200 C; Solubility, in acetone and aqueous sodium hydroxide; moderately in ether and alcohol; insoluble in water; yellow solid. Chemical properties: phenolic properties. Suggested uses: plasticizer, antioxidant, UV light absorber, tanning agent, dye intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Koppers Company, Inc., Chemicals & Dyestuffs Div.

## CP ZIRCONIUM OXIDE

$ZrO_2$ . MW, 123; Purity, 99.85 as zirconium oxide; white. Chemical properties: small particle size. Suggested uses: piezoelectric ceramics, zirconium oxide standards; spectrographic tracers; pharmaceutical applications. Introduced as: significantly new grade. Availability: commercial quantities. Titanium Zirconium Co.

## CROTONONITRILE

(2-butene nitrile)

$C_4H_7N$ . MW, 67.09; SpG, 813; BP, 110-116 C; Flash P, <100 C; RI, 1.417; Water content, <0.1%; Purity, mixture of cis & trans isomer; Solubility, in organic solvents; insoluble in water; colorless liquid. Suggested uses: monomer and chemical intermediate. Introduced as: new chemical product. Availability: commercial quantities. Roberts Chemicals, Inc.

## CRYSTAL-BAR COLUMBIUM

(niobium)

Ch. MW, 92.91; SpG, 8.55; MP, 1950 C; BP, 2900 C; 5/16" diameter bars. Chemical properties: interstitial C, O, N, H virtually eliminated. Introduced as: significantly new grade. Availability: laboratory quantities. Metal Hydrides Inc.

## CRYSTAL-BAR ZIRCONIUM

Zr. MW, 91.22; SpG, 6.4; MP, 1900 C; BP, 2900 C; 5/16" diameter bars. Chemical properties: interstitial C, O, N, H virtually eliminated. Introduced as: significantly new grade. Availability: semi-commercial quantities. Metal Hydrides Inc.

## CYCLIC CHOLINE XANTHATE

$C_8H_{13}OS_2$ . MW, 165; MP, decomposes @ 138-139 C; % Active, 77 as choline chloride; pH, 9.9 (saturated soln); Water content, none; Purity, 99%; Solubility, 1% in water; yellow crystals. Chemical properties: non-hygroscopic;

fully available as choline in animal feeds. Suggested uses: as choline source in animal feeds. Introduced as: new chemical product. Availability: laboratory quantities. Dawe's Laboratories, Inc., Fine Chemicals Div.

## 1,4-CYCLOHEXANEBIS(METHYLAMINE)

$C_6H_{12}N_2$ . MW, 142.2; Flash P, 235 F (C.O.C.); RI, 1.4920 @ 20/D; Viscosity, 5.57 cs @ 100 F; Solubility, miscible in water, water in ethanol, ether, acetone, benzene, ethyl acetate; clear liquid. Suggested uses: chemical intermediate in the preparation of condensation polymers. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

## DECENE-1

SpG, 0.742 @ 20/20 C; BP, I.B.P. 164.4 95% over at: 173.5 C; Flash P, P-M -120 F; RI, 1.4215 @ n 20/D; Saybolt +30. Suggested uses: chemical intermediate for addition reactions, alkylation, polymerization, copolymerization, etc. normal to olefin double bond. Introduced as: new chemical product. Availability: laboratory quantities. Gulf Oil Corp., Petrochemicals Dept.

## DEUTERIUM

D<sub>2</sub>. MW, 4.032; MP, 18.65 K; BP, 23.6 K; Purity, 99.5 mole% min; colorless gas. Chemical properties: enters into all the reactions characteristic of ordinary hydrogen, although generally more slowly and less completely. Suggested uses: for study of exchange reactions; for study of metabolic processes with Deuterium as a tracer; in the bombardment of various target materials with deuterons. Introduced as: product with new degree of availability. Availability: laboratory quantities and semicommercial quantities. The Matheson Co., Inc.

## 2,5-DI-tert-AMYLHYDROQUINONE

$C_{16}H_{24}O_2$ . MW, 250.37; SpG, 1.05 @ 25/25 C; MP, 176 C; Solubility, 5% in benzene, 50% in ethanol, 1.5% in styrene, 28.6% in vinyl acetate; white to light buff powder. Suggested uses: stabilizer, inhibitor and antioxidant. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemical Div.

## DICHLORODIANISIDINE

(3,3'-dimethoxy-6,6'-dichlorobenzidine)

$C_{14}H_{10}O_2N_2Cl_2$ . MW, 313; MP, 173 C min; % Active, 80 min; Water content, 20% max; Purity, 98%; gray to brown crystals. Introduced as: new chemical product. Availability: semicommercial quantities. Alliance Chemical Corp.

## DIETHANOLAMINE OXOMOLATE

Constituents: diethanolamine salt of an oxidized selected petroleum fraction (50% carried in a low viscosity mineral oil or kerosene (49.5%); water (0.5%). Suggested uses: as an ashless additive for gasolines and other selected petroleum fractions and as a rust preventive in natural gas pipe lines. Introduced as: new chemical product. Availability: semicommercial quantities. Witco Chemical Co., Inc., Organic Chemicals Div.

## DIETHYLTHIOCARBAMYL CHLORIDE EC 2554

(n,n-diethylthiocarbamyl chloride)

$C_6H_{10}NSCl$ . MW, 151.7; MP, 41-43 C; % Active, 85-90; Purity, decomposes @ 192 C; 10-12% sulfur free; amber solid. Chemical properties: acid chloride reacts with active hydrogen. Suggested uses: polymer modification; synthesis of stabilizers; insecticides; fungicides & rubber chemicals. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## DIFLUORODIAZINE

$N_2F_2$  (Available as cis or trans or as mixtures of the two forms); MW, 66.02; BP, cis: -105.7 C, trans: -114.4 C; colorless gas (or liquid, at cryogenic temperatures); Triple point, <-195 C (cis), -172 C (trans); Critical temp, -1.0 C (cis), -13 C (trans); Critical pres-

sure, 70 atm (cis), 55 atm (trans). Suggested uses: chemical intermediate; research chemical. Introduced as: new chemical product. Availability: semicommercial quantities. Air Products and Chemicals, Inc., Defense and Space Div.

## DI-n-HEXYLAMINE EC 1193

$C_{12}H_{27}N$ . MW, 185.34; SpG, 0.788; BP, 230-245 C; Flash P, 95 C; RI, 1.434-1.436; % Active, 99; Solubility, slightly in water; water white liquid; no turbidity or suspended matter. Chemical properties: absorbs inorganic anions from acid solution, e.g., uranyl ion. Suggested uses: flotation agent; intermediate for rubber chemicals, agricultural chemicals, blowing agents, etc. Introduced as: new chemical product. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## DI-n-HEXYLTHIOUREA

$C_8H_{18}N_2S$ . MW, 142.2; MP, 244.4 (calc'd); Set point, 41.0 C; tan, granulated. Suggested uses: chemical intermediate; corrosion inhibition. Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## 2,5-DIHYDROXY-1,4-BENZOQUINONE

$C_6H_4O_4$ . MW, 140.09; MP, decomposes at 216 C; Purity, technical grade; Solubility, 30-40% in concn  $H_2SO_4$ , propylene glycol, acetone; 1-5% in water, benzene, concn HCl, 1N  $NaHCO_3$ ; yellow-orange solid. Chemical properties: contains two reactive hydroxyl groups. Suggested uses: metal-chelating agent, polymerization inhibitor, tanning agent, and coupling agent in dyestuff. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

## 2,8-DIHYDROXY-3-NAPHTHOIC ACID

$C_{11}H_8O_4$ . MW, 204.17; MP, 235-240 C; Purity, 95% min; Solubility, in alcohol and acetone; slightly in hot water; light green powder. Suggested uses: an intermediate in dye, pharmaceutical and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## 2,6-DIMETHOXYBENZOIC ACID

MP, 186-188 C; Water content, 1% max; Solubility, 0.35 wt% at 25 C; 0.78 wt% at 50 C; 1.96 wt% at 75 C; white to light tan crystals. Suggested uses: intermediate in preparation of amides, esters, alcohols etc.; key intermediate in preparation of gamma-resorcylic acid; preparation of staphylococci-resistant penicillin. Introduced as: new chemical product. Availability: laboratory quantities. Lithium Corp. of America.

## 2,6-DIMETHOXYBENZOIC ACID

$C_8H_{10}O_4$ . MW, 182.18; MP, 186-190 C; Water content, 0.5% max; Purity, 98% min; Solubility, in alcohols, ketones & esters; slightly in water; white to slightly yellow crystals. Chemical properties: reactive carboxylic acid group may be converted to salts, acid chloride, amide, esters and nitrile. Suggested uses: pharmaceutical intermediate; possibly in agricultural, perfume, flavor, petroleum and plastic industries. Introduced as: new chemical product. Availability: laboratory quantities. Benzol Products Co.

## 2,4-DIMETHOXY-5-CHLOROANILINE

$C_7H_9ClNO_2$ . MW, 187.63; MP, 90-91 C; Purity, 98.5%; Solubility, in alcohol, benzene & other organic solvents; insoluble in water; violet-gray crystalline powder. Chemical properties: toxic, care should be exercised in handling. Suggested uses: intermediate in manufacture of dyes and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## 2,5-DIMETHOXY-4-CHLOROANILINE

$C_7H_9ClNO_2$ . MW, 187.6; MP, 114-115 C; Solubility, in acetone; slightly in alcohol, ether, benzene and xylene; insoluble in water; pink powder. Suggested uses: dye intermediate. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.



### 2,5-DIMETHOXYCHLOROBENZENE

$C_8H_8ClO_2$ . MW, 172.6; Congealing P, 6.7 C; BP, 238-242 C; Flash P, 117 C; RI, 1.5470 @ 25 C; Solubility, in alcohol, ether, acetone, benzene and xylene, slightly in water; amber colored liquid. Suggested uses: dye intermediate. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

### 2,4-DIMETHOXY-5-CHLORONITROBENZENE

$C_8H_7ClNO_4$ . MW, 218.63; MP, 121-124 C; Solubility, in chloroform and ether; slightly in cold alcohol; insoluble in water; light yellow powder. Suggested uses: intermediate in manufacture of dyes and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

### 2,5-DIMETHOXY-4-NITROCHLOROBENZENE

$C_8H_7ClNO_4$ . MW, 217.6; MP, 134-138 C; Solubility, insoluble in water; light yellow powder. Suggested uses: dye intermediate. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

### 2,6-DIMETHOXYPHENYL LITHIUM

MW, 144.15; white-to-tan free-flowing powder. Suggested uses: intermediate in organolithium reactions. Introduced as: new chemical product. Availability: laboratory quantities. Lithium Corp. of America.

### DIMETHYLAMINOETHYL METHACRYLATE (DMAEMA)

$C_9H_{15}NO_2$ . Formula wt, 157; SpG, 0.933 @ 25°C/4C; Freezing P, ca -30 C; Density, 0.914 @ 25 C; Inhibitor (MEHQ), 0.2%; BP, 97.5C @ 40mm Hg, 87.5C @ 25mm Hg, 68.5C @ 10mm Hg; Flash P, 165 F (T.O.C.); RI, 1.4376 n 25/D; Viscosity, 1.13 cs @ 38 C; Solubility, in water and organic solvents, but hydrolyzes slowly; clear, mobile liquid, 50 max (APHA). Chemical properties: polymerizable acrylic monomer which can be employed to introduce tertiary amine groups into polymeric systems; pendant t-amine group is highly reactive, providing cationic properties which can be enhanced by quaternization. Suggested uses: of specific interest in the preparation of copolymers with improved adhesion & increased dyeability. Introduced as: product with new degree of availability. Availability: commercial quantities. Rohm & Haas Co., Special Products Dept.

### N-DIMETHYL-3-AMINO-4-METHYLBENZENE SULFONAMIDE

$C_{10}H_{14}N_2O_2S$ . MW, 214.29; MP, 124-126 C; Solubility, partially in alcohol and acetone; insoluble in water; white powder. Suggested uses: intermediate in dyes and pharmaceuticals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

### DIMETHYL-1,4-CYCLOHEXANEDI-CARBOXYLATE

$C_{10}H_{18}O_4$ . MW, 200.23; SpG, 1.102 @ 35/4 C; MP, 14 C (cis stereoisomer); BP, 265 C @ 760 mm; Flash P, 275 F (C.O.C.); Solubility, 0.96% in water, 20% in water; partially crystallized in liquid. Chemical properties: may exist as the cis or trans stereoisomer. Suggested uses: chemical intermediate in preparation of plasticizers, polyesters, polyamides and alkyds. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### 2,5-DIMETHYL-2,4-HEXADIENE

$C_8H_{14}$ . MW, 110.2; SpG, 0.762 @ 25/25 C; BP, 132-136 C @ 760 mm; Flash P, 85 F (T.O.C.); RI, 1.4772 @ 25/D; Viscosity, 28.9 @ 0 C; SUS; Purity, 99%; Solubility, miscible with acetone, ethanol, diethyl ether, benzene, naphtha; 10 ppm APHA. Liquid. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### 2,2-DIMETHYL-3,4-OCTADIENAL

$CH_{14}O_2$ . MW, 144.21; SpG, 1.150 @ 20/4 C; MP, 41-61 C; BP, 285 C @ 760 mm; Flash P,

165 F (C.O.C.); RI, 1.4893 @ 20/D; Viscosity, 1421.6 cs @ 75 F; Water content, trace; Purity, 96.8%; Solubility, miscible with water, methanol and ethanol; 5 ppm APHA, partially crystallized liquid. Chemical properties: good chemical reactivity; esters exhibit good hydrolytic and thermal stability. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### DIMETHYL UREA (DMU)

$C_3H_8N_2O_3$ . MW, 120.1; MP, 120-125 C; % Active, 94-98; pH, 7.8-8.6; Water content, 2-6%; Purity, 94-98%; Solubility, 20% in water @ 60 F; white, powder. Suggested uses: in adhesive, chemical, construction, resin, finishes, paper, textile, metal casting, ceramics, leather, inks, and thermoetting plastics industries. Introduced as: significantly new grade. Availability: commercial quantities. Chas. L. Huisking & Co., Inc., Glyco Chemicals Div.

### 1,4-DIMETHYLPENTYLAMINE

$C_7H_{17}N$ . MW, 115.21; SpG, 0.7611 @ 20/20 C; BP, 129-135 C @ 760 mm; Flash P, 76 F (T.O.C.); RI, 1.4160 @ 20/D; Purity, 97%; Solubility, 0.01% in water, 59.0% water in; colorless, stable liquid. Chemical properties: branched-chain reactive primary amine. Suggested uses: in rubber and agricultural chemicals, pharmaceuticals, surfactants, inhibitors and petroleum additives. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### 2,2'-DINAPHTHYL

$C_{20}H_{14}$ . MW, 254.31; MP, 187-188 C; BP, 452 C; Purity, 99%; Solubility, in most organic solvents, insoluble in water. Chemical properties: derivatives can be used to build up condensed ring structures; chlorinates to a high mw yellowish resin. Suggested uses: heat transfer medium; dye intermediate; chlorinated, as polymer additive. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

### 2,6-DINITROANILINE

$C_6H_5N_2O_4$ . MW, 183.13; pH, neutral; Purity, approx 100% amine; Solubility, in 60% sulfuric acid; slightly in cold water; yellow solid. Chemical properties: can be diazotized and then coupled with phenolic compounds. Suggested uses: intermediate; pesticide. Introduced as: product with new degree of availability. Availability: commercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

### 2,4-DINITROBENZENE SULFONIC ACID

$C_6H_4N_2O_7S$ . MW, 249.2; MP, 100-120 C (max 5° range); Water content, 18% max; Purity, 95% min; Solubility, in water, acetone and alcohol; insoluble in benzene; light brown, odorless powder. Chemical properties: commercially available as the free acid or the sodium salt. Suggested uses: catalyst; oxidizing agent; intermediate for pharmaceutical and electrochemical use. Introduced as: significantly new grade. Availability: commercial quantities. Pfister Chemical Works.

### 2,6-DINITROPHENOL (1-hydroxy-2,6-dinitrobenzene)

$C_6H_4N_2O_5$ . MW, 184.11; MP, 60-61 C; pH, neutral; Water content, 20%; Purity, 80% (20% water added); Solubility, in aqueous alkaline solutions; slightly in cold water; yellow paste. Chemical properties: mild explosive, must be kept wet. Suggested uses: indicator; intermediate; pesticides. Introduced as: product with new degree of availability. Availability: commercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

### DIOCTYL HYDROGEN PHOSPHITE [bis(2-ethylhexyl)hydrogen phosphite]

MW, 306; SpG, 0.934 @ 25/15.5 C; MP, glassy at very low temperatures; BP, 100 C approx. @ 0.05 mm; Flash P, 320 F (C.O.P.); RI, 1.4440 @ 25 C; Viscosity, 7.40 cps @ 68 F, 4.40 cps @ 210 F; Purity, 92.5%; Solubility, in ethanol, hexane, benzene and acetone; insoluble in water; clear, straw-colored

liquid. Suggested uses: resin plasticizer. Introduced as: new chemical product. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

### DIPENTITE (diphenylpentaerythritol diphosphite)

MW, 380; Density, solid; MP, 114 C; BP, 190-200 C @ 0.1 mm; Solubility, in ethanol (reacts), benzene, and acetone; slightly in hexane; insoluble in water (reacts); white powder. Suggested uses: ingredient of stabilizer systems for resins. Introduced as: new chemical product. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

### DIPHENYLDECYL PHOSPHITE

$(C_6H_5O)_2P(OC_{10}H_{21})$ . MW, 374; SpG, 1.023 @ 25/15.5 C; MP, 18 C; Flash P, 425 F (C.O.P.); RI, 1.5160 @ 25 C; Acidity, 0.05 (mg KOH/gm) max; Viscosity, 7.82 cs @ 100 F, 2.26 cs @ 210 F; Solubility, in ethanol, hexane, benzene, and acetone; insoluble in water; almost water-white liquid. Suggested uses: chemical intermediate; resin plasticizer. Introduced as: product with new degree of availability. Availability: commercial quantities. Hooker Chemical Corp., Eastern Chemical.

### DIPHENYL HYDROGEN PHOSPHITE

MW, 234; SpG, 1.2208 @ 25/15.5 C; Last crystal point, 12 C; BP, approx. 100 C @ 0.05mm; Flash P, 350 F (C.O.P.); RI, 1.5566 @ 25 C; Viscosity, 15.90 cps @ 68 F, 8.47 cps @ 100 F; Solubility, in acetone, benzene and ethanol; insoluble in water and hexane; clear, straw-colored liquid. Suggested uses: resin plasticizer. Introduced as: new chemical product. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

### DIPHENYL MERCURY

$(C_6H_5)_2Hg$ . MW, 354.81; MP, 125-126 C; % Hg, 56.4-56.7; Vapor pressure,  $1.1 \times 10^{-6}$  mm @ 20 C; Solubility, .01 gms/100 gms water solution; 4 gms/100 gms acetone solution; 44 gms/100 gms pyridine solution; white microcrystalline powder. Suggested uses: arylating agent for preparation organic-metal compounds and polymers; polymerization catalyst for vinyl monomers and production of polypropylene. Introduced as: new chemical product. Availability: semicommercial quantities. Aceto Chemical Co.

### DISODIUM HYDROXYETHYL IMINO DIACETATE

$C_4H_6O_5NNa_2$ . MW, 221; SpG, approx. 1.20; Decomposes @ approx. 250 C; % Active, 42; pH, 11-12; Water content, 56%; Purity, commercial; Solubility, all proportions; yellow to straw, semi-viscous liquid. Chemical properties: forms weak chelates with most di- and trivalent metal ions. Suggested uses: electroplating, metal chelates for agriculture, possible tanning agents. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Refined Products Co.

### DODECENE-1

SpG, 0.759 @ 20/20 C; BP, I.B.P. 206.9 95% over at 219.9 C; Flash P, P-M 174 F; RI, 1.4303 @ n 20/D; Saybolt 30. Suggested uses: chemical intermediate for addition reactions, alkylation, polymerization, copolymerization, etc. normal to olefin double bond. Introduced as: new chemical product. Availability: laboratory quantities. Gulf Oil Corp., Petrochemicals Dept.

### 6-DODECYNE

$C_{12}H_{22}$ . BP, 88-90 C @ 7 mm; Purity, 97%. Suggested uses: organic synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Farchan Research Labs.

### ETHOXYACETYLENE

$C_4H_6O$ . MW, 70.09; SpG, 0.799 @ d 20/4; BP, 51-52 C; Flash P, <20 F; RI, 1.3812 @ n 20/D; Purity, 99% min.; Solubility, in most organic solvents; colorless liquid. Suggested uses: intermediate for pharmaceuticals, polymers, rocket fuels. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Pfister Chemical Works.



# NEW CHEMICALS FOR INDUSTRY

## ETHYL ACRYLATE

$C_5H_8O_2$ ; Inhibitor content, 15 ppm MEHQ. Formula wt, 100; SpG, 0.917 @ 25/15.6 C; B Range, 98.8-99.8 C @ 760 mm; Flash P, 50 F (T.O.C.), 48.2 F (T.C.C.); RI, 1.4034 @ 25 C; Water content, 0.03% (by Karl Fischer); Purity, 99.0%; 5 (APHA), liquid; Density, 0.917 g/cc (25/15.6 C); Acidity, (as acrylic acid) 0.0008%; Vapor pressure, 8.7 mm @ 0 C; Latent heat of vaporization,  $8.3 \pm 0.4$  kcal/mole; Heat of polymerization, 15.6 kcal/mole; Specific heat, 0.47 kcal/g/°C. Suggested uses: polymerizable monomer for thermoplastic sheets and molding powders, solvent coatings, latex paints, adhesives, oil additives, unsaturated polyesters, embedding; emulsions for textile, leather, paint finishing, and floor waxes; and as chemical intermediate. Introduced as: significantly new grade. Availability: semicommercial quantities. Rohm & Haas, Special Products Dept.

## N-ETHYL ETHANOLAMINE

$C_2H_5NHCH_2CH_2OH$ . MW, 89.14; SpG, 0.9182 @ 20/20 C; Freezing Point, -7.8 C; BP, 167.2 C @ 760 mm Hg; Flash P, 160 F; RI, 1.4407 @ n 20/D; pH, 0.5 wt%; Viscosity, 15.1 cps @ 20 C; Purity, 100.6 wt%; Solubility, wt% in water: 20 C, inf.; wt% water in, 20 C, inf.; Distillation, IBP 160 C @ 760 mm Hg; Suspended matter, substantially free; Vapor pressure, 0.3 @ 20 C. Suggested uses: acid-gas absorbant; intermediate for detergents, 2,4-D herbicide salts, emulsifiers, soaps for textile cleaners, shampoos, cosmetics, rubbers floor polishes, soluble "oils" for textile processing and metal cutting, pharmaceuticals, ion exchange resins, corrosion inhibitors. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

## GALLIA HYDRATE

$Ga_2O_3 \cdot 1.5H_2O$ . MW, 214.46; Purity, 99.99+%; fine white powder; prepared from 99.9999% pure gallium. Suggested uses: preparation of gallium chemicals. Introduced as: new chemical product. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GALLIUM AMMONIUM CHLORIDE

$GaNH_4Cl_2$ . MW, 229.59; white granular sugary crystals; prepared from 99.9999% pure gallium. Suggested uses: for electro-plating of gallium onto transistor whisker leads and for preparation of gallium chemicals. Introduced as: product with new degree of availability. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GALLIUM NITRATE (ANHYDROUS)

$Ga(NO_3)_3$ . MW, 255.74; Decomposes at 110 C; Purity, 99.99+%; Solubility, in absolute alcohol; very in water; insoluble in ether; white powder; prepared from 99.9999% pure gallium. Suggested uses: preparation of gallium chemicals. Introduced as: new chemical product. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GALLIUM NITRATE (HYDRATED)

$Ga(NO_3)_3 \cdot 8H_2O$ . MW, 275.86; Decomposes at 110 C; Purity, 99.99+%; Solubility, in absolute alcohol; very in water; insoluble in ether; white crystals, deliquescent; prepared from 99.9999% pure gallium. Suggested uses: preparation of gallium chemicals. Introduced as: new chemical product. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GALLIUM OXIDE

$Ga_2O_3$ . MW, 187.44; SpG, 5.88; MP, approx 1740 C; Purity, 99.99+%; Solubility, in hot acids and bases; insoluble in water; white granules or powder of beta monoclinic crystals; prepared from 99.9999% pure gallium. Chemical properties: Heat of formation, 250 K cal/mole. Suggested uses: diffused or vapor phase doping of semiconductor; preparation of gallium chemicals. Introduced as: new chemical product. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GALLIUM SULFATE (ANHYDROUS)

$Ga_2(SO_4)_3$ . MW, 427.64; Decomposes above 600 C; Purity, 99.99+%; Solubility, very in water; white, crusty amorphous lumps or powder; prepared from 99.9999% pure gallium. Chemical properties: Sp. heat, 0.14 cal/g. Suggested uses: preparation of gallium chemicals.

Introduced as: new chemical product. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GALLIUM TRICHLORIDE (ANHYDROUS)

$GaCl_3$ . MW, 176.09; MP, 77 C; BP, 200 C; Heat of formation, 125 K cal/mole; Solubility, in ammonia; very in water; white needle like crystals; prepared from 99.9999% pure gallium. Chemical properties: very hygroscopic. Suggested uses: preparation of gallium chemicals. Introduced as: new chemical product. Availability: commercial quantities. Aluminum Co. of America, Chemical Div.

## GLUCONIC ACID 50%

$C_6H_{12}O_7$ . Water clear liquid; trace elements common in fermentation produced product are not present; produced by catalytic air oxidation for the first time. Suggested uses: sequestrant for cleaning compounds. Introduced as: significantly new grade. Availability: commercial quantities. Cowles Chemical Co.

## GLYCOL ETHER AMINES (alkoxyalkylamines)

$C_4H_9NO$  and  $C_4H_9NO_2$ . Constituents: methoxyethyl, di(methoxyethyl), ethoxyethyl, di(ethoxyethyl), and methoxyisopropylamine. MW, 75, 133, 89, 161, & 89; SpG, 0.89, 0.91, 0.85, 0.88, 0.84; MP, all <-40 C; BP, 91, 172, 107, 194, 98 C; Flash P, 20, 65, 20, 85, 20 C; RI, 1.4058, 1.4190, 1.4086, 1.4205, 1.4038; % Active, 100; Water content, <1%; Purity, 98% min; Solubility, miscible with water and all common organic solvents; colorless liquids. Chemical properties: typical amine chemistry; mild basicity and water solubility of alkanolamines; other properties of aliphatic amines. Suggested uses: intermediates for agricultural and pharmaceutical products, specialty solvents, corrosion inhibitors, rubber chemicals. Introduced as: new chemical products. Availability: semicommercial quantities. Wyandotte Chemicals Corp., Market Development Dept.

## GLYOXAL-BIS(2-HYDROXYANIL)

$C_{14}H_{12}N_2O_6$ . Purity, reagent grade. Suggested uses: reagent for the spectrophotometric determination of calcium and vanadium. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

## HEXADECENE-1

SpG, 0.781 @ 20/20 C; BP, I.B.P. 271.4, 95% over @ 300.4 C; Flash P, P-M 270 F; RI, 1.4411 @ n 20/D; Saybolt +30. Suggested uses: chemical intermediate for addition reactions, alkylation, polymerization, copolymerization, etc. normal to olefin double bond. Introduced as: new chemical product. Availability: laboratory quantities. Gulf Oil Corp., Petrochemicals Dept.

## HEXENE-1

SpG, 0.674 @ 20/20 C; BP, I.B.P. 62.5, 95% over @ 65.5 C; Flash P, P-M, room temperature; RI, 1.3582 @ n 20/D; Saybolt +30. Suggested uses: chemical intermediate for addition reactions, alkylation, polymerization, copolymerization, etc. normal to olefin double bond. Introduced as: new chemical product. Availability: laboratory quantities. Gulf Oil Corp., Petrochemicals Dept.

## HEXOL CHLORIDE

[tris(bisethylenediaminecobalt(III)-diol) cobalt(III) chloride tetrahydrate].  $Co[(HO)_2Co(C_2H_4)(NH_2)_2]_3Cl_4 \cdot 4H_2O$ . Purity, reagent grade; dark brown, crystalline solid. Suggested uses: cation carrying a plus six charge; for studies in colloids and similar systems. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

## HOMOPIPERAZINE

$HNCH_2CH_2CH_2NHCH_2CH_2$ . MW, 100.17; SpG, 1.0335 @ 20/20 C; BP, 169.1 C @ 760 mm Hg; Flash P, 77 C (O.C.); RI, 1.0335 @ n 20/D; Vapor pressure, 0.7 @ 20 C; Purity, 98.2 wt%; Solubility, 27.3 wt% in water; white, solid product. Chemical properties: has unique seven-membered ring containing two nitrogen atoms. Suggested uses: intermediate for pharmaceuticals, antihelmintics, surface active agents, and synthetic fibers. Introduced as: new chemical product. Availability: laboratory quantities. Union Carbide Chemicals Co.

## HYDRIPILLS

$NaBH_4 \cdot CoCl_2$ . Constituents: sodium borohydride 92.5%; cobalt chloride 7.5%. SpG, 1.0; dark grey pellets, 5/16" dia and 3/4" dia; Chemical properties: react with water to produce hydrogen and cobalt boride. Suggested uses: lightweight, portable source of hydrogen, in situ catalytic hydrogenation of trace impurities in organic products, polymerization catalyst. Introduced as: new chemical product. Availability: commercial quantities. Metal Hydrides, Inc.

## 2-HYDROXY-1',2'-BENZOCARBAZOLE-3-CARBOXYLIC ACID

$C_{17}H_{11}NO_3$ . MW, 277.26; MP, 315-320 C; Purity, 85% min; Solubility, in ethyl alcohol and acetone; insoluble in water; light green powder. Suggested uses: in the manufacture of dye intermediates and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## 2-HYDROXYETHYL METHACRYLATE (HEMA)

$C_6H_{11}O_3$ . Constituents: HEMA 96%; ethylene dimethacrylate 1.0%; methacrylic acid 3.0%. Formula wt, 130.1; SpG, 1.077 @ 60/60 F; Freezing P, -12 C; Density, 1.077 @ 25 C; B Range, 60 C @ 0.5 mm Hg; 68 C @ 1 mm Hg; 87 C @ 5 mm Hg; 95 C @ 10 mm Hg; RI, 1.4510 n. 25/D; Flash P, 108 C (C.O.C.); Viscosity, 4.8 cs @ 30 C; Purity, 96.0%; Solubility, miscible with water & common organic solvents; 100(APHA), clear, mobile liquid. Suggested uses: as comonomer in polymeric systems, coatings, nonwoven fabrics and wool stabilization formulations, alloplastic and prosthetic applications. Introduced as: new chemical product. Availability: developmental quantities. Rohm & Haas, Special Products Dept.

## 5-HYDROXYISOPHTHALIC ACID

$C_8H_6O_5$ . Constituents: contains small amounts of other isomers and salt. MW, 182.13; MP, 270-280 C; Water content, essentially anhydrous; Purity, 95%; off white to white powder; no odor. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Alliance Chemical Corp.

## 2-HYDROXYPROPYL METHACRYLATE (HPMA)

$C_7H_{12}O_4$ . Constituents: HPMA, 96.5%; 12-propylene dimethacrylate, 0.5%; methacrylic acid, 3.0%. Formula wt, 144.1; SpG, 1.027 @ 60/60 F; Freezing P, <-70 C; Density, 1.027 @ 25 C; B Range, 58 C @ 0.5 mm Hg; 66 C @ 1 mm Hg; 87 C @ 5 mm Hg; 96 C @ 10 mm Hg; Flash P, 121 C (C.O.C.); RI, 1.4460 n. 25/D; Viscosity, 6.2 cs @ 30 C; Purity, 96.5%; Solubility, in common organic solvents; limited solubility in water; 100 (APHA), clear, mobile liquid. Suggested uses: as comonomer in polymeric systems, coatings, nonwoven fabrics and wool stabilization formulations. Introduced as: new chemical product. Availability: developmental quantities. Rohm & Haas Co., Special Products Dept.

## ISOAMYLENES

$C_5H_{10}$ . Constituents: 2-methyl butene-1 and 2-methyl butene-2. MW, 70; SpG, 0.6722 @ 60/60 C; BP, 32-49 C; % Active, 90%+; Water content, <300 ppm; Purity, 90%; Solubility, in organics; clear liquid. Chemical properties: excellent freedom from other olefins and diolefins; high isoamylenes purity. Suggested uses: t-isoamyl derivatives; i.e., t-isoamyl alcohol. Introduced as: significantly new grade. Availability: semicommercial quantities. Petro-Tex Chemical Corp.

## ISOPHTHALOYL CHLORIDE (m-phthalyl dichloride)

$C_8H_4(COCl)_2$ . MW, 203.03; Density, 1.387 @ 46.9 C; Freezing P, 43.3 C; BP, 276 C; Flash P, 180 (C.O.F.) C; Purity, 98%; Solubility, (parts/100 parts solvent) hexane, 35.6 @ 23 C; benzene, 250.0 @ 23 C; carbon tetrachloride, 62.6 @ 23 C; white, crystalline solid. Chemical properties: undergoes typical acid chloride reactions. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: Hooker Chemical Corp., Eastern Chemical Div.



### ISOPROPYL ACETYLENE (3-methyl-1-butyne)

$C_4H_6$ ; BP, 27 C; Purity, 97-98%; water white liquid. Suggested uses: in organic synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Farchan Research Labs.

### LITHIUM m-BORATE

$LiBO_2$ . Purity, reagent grade; solid white, crystalline. Suggested uses: flux for the decomposition of silicates for X-ray examination and chemical analysis. Introduced as: new chemical product. Availability: semicommercial quantities. G. Frederick Smith Chemical Co.

### MAGNESIUM AMMONIUM SULFATE

$Mg(NH_4)_2(SO_4)_2 \cdot 6H_2O$ . MW, 360.63; Solubility, in water; white crystalline powder. Introduced as: new chemical product. Availability: semicommercial quantities. City Chemical Corp.

### MALONALDEHYDE ETHYLENE DIACETAL

#### (2,2'-methylene bis-1,3 dioxolane)

$C_6H_{12}O_4$ . MW, 160; MP, 36-39 C; BP, 65-73 C @ 1 mm; Purity, approx 98%; Solubility, in water, alcohol, and hydrocarbons; white solid. Introduced as: new chemical product. Availability: laboratory quantities. Kay-Fries Chemicals, Inc., Development Dept.

### METHANE, C.P.

$CH_4$ . MW, 16.04; SpG, 0.5544 (Air=1); MP, -182.5 C; BP, -161.6 C; Viscosity, 0.012 cps @ 60 F; Purity, 99 mole % min; colorless gas. Chemical properties: most inert member of the paraffin series of hydrocarbons. Introduced as: product with new degree of availability. Availability: commercial quantities. The Matheson Company, Inc.

### METHYL ACRYLATE

$C_5H_8O_2$ . Constituents: inhibitor content 15 ppm MEHQ. Formula wt, 86; SpG, 0.950 @ 25/15.6 C; B Range, 79.8-80.3 @ 760 mm; Flash P, 50 F (T.O.C.); 26.6 F (T.C.C.); RI, 1.4003 @ 25 C; Water content, 0.06% (by Karl Fischer); Purity, 98.8%; 5 (APHA), liquid; Density, 0.950 g/cc @ 25/15.6 C; Acidity, as acrylic acid 0.0008%; Vapor pressure, 23.4 mm @ 0 C; Latent heat of vaporization, 7.9 ± 0.4 kcal/mole; Heat polymerization, 19-20 kcal/mole; Specific heat, 0.48 kcal/g/C. Suggested uses: polymerizable monomer for thermoplastic sheets & molding powders, solvent coatings, latex paints, adhesives, oil additives, unsaturated polyesters, embedding; emulsions for textile, leather, paper finishing, and floor waxes; and as chemical intermediate. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas Co., Special Products Dept.

### 3-METHYL-1-BUTANOL

$CH_3CH(CH_3)CH_2CH_2OH$ ; MW, 88.15; SpG, 0.8108 @ 20/20 C; Freezing P, -117 C; BP, 130.8 @ 760 mm Hg; Flash P, 45.5 C (O.C.); RI, 1.4070 @ n 20/D; Viscosity, 4.2 cps @ 20 C; Water content, 0.5 wt%; Purity, 99.54 wt%; Solubility, wt% in water, 2.38 @ 20 C; wt% water in, 9.69 @ 20 C; Vapor pressure, 1.94 @ 20 C; water white, mobile liquid. Suggested uses: solvent for protective coatings, dyes, inks, specialty applications; intermediate for plasticizers, weed killers, surfactants, ore collectors, lube oil additives, synthetic flavors and odors, pharmaceuticals. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

### METHYLETHANOLAMINE EC 2178 (N-methylethanolamine)

$C_2H_7ON$ . MW, 75.1; SpG, 0.930-0.950; BP, 155-165 C; % Active, 97; Solubility, miscible; water white to light straw liquid. Chemical properties: lowest molecular wt alkyl alkanolamine; difunctional secondary amine. Suggested uses: polyurethane catalyst and modifier; intermediate for agricultural and pharmaceutical chemicals. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals.

### 2-METHYLIMIDAZOLE

$C_4H_6N_2$ ; MW, 82; MP, 135.9 C; BP, 263.5 C; % Active, 95+; Solubility, in water and ethanol; slightly in ether and benzene; white crystalline solid, no appreciable amine

odor. Suggested uses: chemical intermediate, inhibitors, metal complexing agent, pharmaceuticals, epoxy curing agent. Introduced as: new chemical product. Availability: laboratory quantities. Houdry Process Corp. R&D Comm.

### MICROTRAPS

#### (sodium or calcium aluminosilicates)

Constituents: a rigid silica-alumina crystal lattice containing sodium or calcium ions; a zeolite structure. Powders, beads, or irregular granules, each of controlled size. Chemical properties: desiccants and selective absorbents. Suggested uses: dehydration of gases & liquids; selective separation of organic compounds; catalyst carriers. Introduced as: product with new degree of availability. Availability: commercial quantities. W. R. Grace & Co., Davison Chem Div.

### MIXED NORMAL C<sub>12</sub>-C<sub>14</sub> MERCAPTANS

Constituents: n-dodecyl mercaptan, n-tetradecyl mercaptan. MW, 208.0; SpG, 0.841 @ 20 C; BP, 274-313 C; Solubility, in water; water white liquid. Suggested uses: polymerization modifier, chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Industrial Chemicals.

### MIXED NORMAL C<sub>10</sub>-C<sub>12</sub>-C<sub>14</sub> MERCAPTANS

Constituents: n-decyl mercaptan, n-dodecyl mercaptan, n-tetradecyl mercaptan. MW, 201.1; SpG, 0.845 @ 20 C; BP, 256-313 C; Solubility, in water; water white liquid. Suggested uses: polymerization modifier, chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Industrial Chemicals.

### MIXED NORMAL C<sub>14</sub>-C<sub>16</sub>-C<sub>18</sub> MERCAPTANS

Constituents: n-tetradecyl mercaptan, n-hexadecyl mercaptan, n-octadecyl mercaptan. MW, 245.0; SpG, 0.842 @ 20 C; BP, 1BP 245 C; decomposes 333 C; Solubility, insoluble in water; water white liquid. Suggested uses: polymerization modifier; chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Industrial Chemicals.

### 2,2'-NAPHTHYLTHIONAPHTHENE (2,2'-naphthylbenzo-θ-thiophene)

$C_{18}H_{12}S$ . MW, 260.34; MP, 213-214 C; Water content, nil; Purity, 99%; Solubility, in most organic solvents; insoluble in water. Chemical properties: forms chlorinated derivatives that are yellowish resins with a m.w. of about 600. Suggested uses: dyes & pharmaceutical intermediates, oil additives, insecticides and pesticides. Introduced as: new chemical product. Availability: laboratory quantities. Gallard-Schlesinger Chemical Mfg. Corp.

### NEODECANOL (2,2-dimethyloctanol)

$C_{10}H_{22}O$ . MW, 158; SpG, 0.8319 @ 20/20 C; MP, -52 C; BP, 208 C @ 760 mm C; Flash P, 205 F (C.O.C.); RI, 1.4350 @ 25/D; Purity, 98.5%; Solubility, 0.1% in water; miscible in ethanol, ethyl ether, benzene, naphtha; 5 ppm APHA, liquid. Chemical properties: contains neopentyl molecular configuration. Suggested uses: chemical intermediate in preparation of plasticizers; specialty retarder solvent. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### NEODODECANOL (2,2-dimethyldodecanol)

$C_{12}H_{26}O$ . MW, 186; SpG, 0.8345 @ 20/20 C; MP, -44 C; BP, 244 C @ 760 mm; Flash P, 235 F (C.O.C.); RI, 1.4408 @ 25/D; Solubility, 0.1% in water; miscible in ethanol, ethyl ether, benzene, naphtha; 15 ppm APHA, liquid. Chemical properties: contains neopentyl molecular configuration. Suggested uses: chemical intermediate in preparation of plasticizer and surface active agents; specialty retarder solvent. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### NEOHEXANOL (2,2-dimethylbutanol)

$C_6H_{14}O$ . MW, 102; SpG, 0.8348 @ 20/20 C; MP, -33 C; BP, 136 C @ 760 mm; Flash P, 120 F (T.O.C.); RI, 1.4157 @ 25/D; Purity, 91.0%; Solubility, 0.53% in water; miscible in ethanol, ethyl ether, ethyl acetate; 5 ppm APHA, liquid. Chemical properties: contains neopentyl molecular configuration. Suggested uses: chemical intermediate in preparation of plasticizers; specialty retarder solvent. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemical Div.

### NEOHEXENE (3,3-dimethyl-1-butene)

$C_6H_{12}$ . MW, 84; SpG, 0.65; MP, -115.5 C; BP, 41.2 C; Flash P, < ambient temp; RI, 1.3760 @ n 20/D; Water content, 0; Purity, 95+; Solubility, in hydrocarbon; colorless liquid. Chemical properties: typical olefin properties. Suggested uses: Chemical intermediate, polymers. Introduced as: new chemical product. Availability: laboratory quantities. Houdry Process Corp.

### NEOOCTANOL (2,2-dimethylhexanol)

$C_8H_{18}O$ . MW, 130; SpG, 0.8295 @ 20/20 C; MP, -52 C; BP, 172 C @ 760 mm; Flash P, 150 F (T.O.C.); RI, 1.4275 @ 25/D; Purity, 92.5%; Solubility, 0.1% in water; miscible in ethanol, ethyl ether, benzene, naphtha; 10 ppm APHA, liquid. Chemical properties: contains neopentyl molecular configuration. Suggested uses: chemical intermediate in preparation of plasticizers, specialty retarder solvent. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

### NEOPENTYL DIETHYL MALONATE

$C_{12}H_{22}O_4$ . MW, 230.31; SpG, 0.960-0.970 @ 25/25 C; RI, 1.4240-1.4250 @ 25 C/D; Purity, 98% min; Solubility, in alcohols, glycols, ketones & esters; insoluble in water; colorless to pale yellow liquid. Chemical properties: reactive methylene hydrogen atom may be replaced with alkyl or aryl groups; carbethoxy groups may be hydrolyzed to the acid which may be converted to a salt, amide or acid chloride. Suggested uses: intermediate for manufacture of barbiturates; of possible interest for production of tobacco and other flavors, perfumes, plasticizers and insecticides. Introduced as: new chemical product. Availability: laboratory quantities. Benzol Products Co.

### NIAX HEXOL LS-490

MW, 700 ave.; SpG, 1.094 @ 20/20 C; Flash P, 340 F; pH, 25 C, in 10:6 ratio of Iso-propanol: Water; 4.0-6.0; Viscosity, 7500-10,000 cps @ 25 C; Water content, wt %: 0.10; Solubility, infinitely in water at 20 C; Hydroxyl number, 480-500 @ mg HOH/g; Suspended matter, substantially free; Acid number, 0.2 max @ mg KOH/g sample. Chemical properties: reactive polyglycol. Suggested uses: intermediate for polymers of rigid urethane foam. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemical Co.

### NICKEL HEXAMINE FLUOBORATE

$[Ni(NH_3)_6](BF_4)_2$ ; MW, 334.53; SpG, 1.557; % Active, 100; Water content, none; Solubility, in acids; slightly in water; insoluble in ammonia soln; small, light-blue octahedra. Chemical properties: slowly decomposes in cold water, faster in warm water; in air ammonia is slowly given off and crystals change to green color; irreversible thermal decomposition begins around 150 C. Introduced as: new chemical product. Availability: laboratory quantities. Allied Chemical Corp., General Chemical Div.

### 3-NITRO-4-CHLOROBENZANILIDE

$C_{12}H_8O_3N_2Cl$ ; MW, 276.68; MP, 133-136 C; Solubility, slightly in alcohol and ether; insoluble in water; yellow powder. Suggested uses: in dyes and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

### 3-NITRO-4-CHLOROBENZOIC ACID

$C_7H_4ClNO_4$ ; MW, 201.57; MP, 170-174 C; Purity, 98.5% min; white to light gray powder.



# NEW CHEMICALS FOR INDUSTRY

Suggested uses: intermediate in the preparation of pharmaceuticals, dyestuffs, preservatives, agricultural chemicals and other organic compounds. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## m-NITRO-p-CRESOL CP-796

$C_7H_7NO_3$ ; MW, 153.13; Sp.G. 1.25; MP, 31-32°C; BP, (atm.) 234.0°C; Flash P., 109°C; RI, 1.5819 @ 25/D; % Active, 98; pH, weak acid; Viscosity, 2.81 cs absolute @ 40°C; Water content, 0.5% max; Purity (TiCl<sub>3</sub> titration) 98.0% min; canary yellow solid, liquid. Chemical properties: easily reduced to corresponding amine. Suggested uses: intermediate for dyestuffs, pharmaceuticals, etc., especially in the reduced form; in organic synthesis and as an organic solvent. Introduced as: product with new degree of availability. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## NITROGEN TRIFLUORIDE

NF<sub>3</sub>; MW, 71.01; Sp.G. 1.54; BP, -128.45°C; Purity, 97.5+%; 99.9+%; Triple P., -208.6°C; Critical temp., -39.3°C; Critical Pressure, 44.7 atm.; Heat of Formation -29.7 Kcal/gm-mol; colorless gas at STP (liquid is colorless, too). Suggested uses: chemical intermediate; gaseous additive to hydrogen stream to give self-fluxing flame for welding torches. Introduced as: product with new degree of availability. Availability: commercial quantities. Air Products and Chemicals, Inc., Defense and Space Div.

## 6-NITROINDAZOLE

$C_7H_5N_3O_2$ ; MW, 163.14; MP, 176-179°C; pH, neutral; Water content, trace; Solubility, in aqueous sodium hydroxide; sparingly in water; light orange powder. Chemical properties: can be coupled with diazotized bases; can be reduced to an amino compound which, after diazotization, will couple with phenolic compounds. Suggested uses: intermediate; research & development. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

## 3-NITRO-4-METHOXYBENZANILIDE

$C_{14}H_{13}O_4N_2$ ; MW, 272.27; MP, 153-155°C; Purity, 98.5% min; Solubility, in alcohol and ether; insoluble in water; pale yellow powder. Suggested uses: used in the manufacture of dyes and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

## n-OCTYL CHLORIDE

$CH_3(CH_2)_7Cl$ ; MW, 148.5; Sp.G. 0.8697; Freezing P., -62°C; BP, 181.6°C; Flash P., 70°C; RI, 1.4288; Solubility, in most organic solvents; insoluble in water; white liquid. Suggested uses: intermediate for plastic film stabilization; chemical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## NORKANE

Constituents: a selected hydrocarbon fraction consisting predominantly of C<sub>12</sub> saturated, straight chain hydrocarbons. Sp.G. 0.757; Distillation range: initial BP, 405°F; 50%, 427°F; Distillation end point, 492°F; Kinematic viscosity, 1.64 cs @ 100°F; Iodine no. 0.0; Pour Pt., -10°F; RI, 1.4212. Suggested uses: for further organic synthesis. Introduced as: new chemical product. Availability: laboratory quantities. Witco Chemical Co., Inc.

## ORIVONE

(p-tert-amyl cyclohexanone)

$C_{11}H_{20}O$ ; MW, 168; Sp.G. 0.918-925 @ 25/25°C; RI, 1.4660-1.4700 @ 20/D; Purity, carbonyl value 317-337; water white liquid. Introduced as: product with new degree of availability. Availability: commercial quantities. International Flavors & Fragrances Inc.

## PENTITE

[tetra(diphenylphosphito) pentaerythritol]

[( $\phi$ -O)<sub>2</sub>P-O-C]<sub>4</sub>C; MW, 1000; Density, 1.24 @ 25°C; MP, 30-60°C; RI, 1.5823 @ 25°C;

Solubility, in ethanol, acetone, hexane and benzene; white waxy solid. Suggested uses: in stabilizer systems. Introduced as: new chemical product. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## 1,10-PHENANTHROLINE-5-SULFONIC ACID, SODIUM SALT

$C_{12}H_7SO_3Na$ ; Purity, reagent grade; white, crystalline solid. Suggested uses: spectrophotometric reagent for iron; base for preparation of ferrous derivative which functions as a high potential oxidation-reduction indicator. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

## PHENYLDIDECYL PHOSPHITE

$C_{26}H_{52}O_3P$ (OC<sub>10</sub>H<sub>21</sub>)<sub>2</sub>; MW, 438; Sp.G. 0.940 @ 25/15.5°C; MP <0°C; Flash P., 425°F (C.O.P.); RI, 1.4785 @ 25°C; Viscosity, 8.95 cs @ 100°F; 2.42 cs @ 210°F; Solubility, in ethanol, hexane, benzene, and acetone; insoluble in water; Acidity, 0.05 (mg KOH/gm) max; nearly water white liquid. Suggested uses: chemical intermediate; resin plasticizer. Introduced as: product with new degree of availability. Availability: commercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## PHENYL DIETHYL ACETIC ACID

$C_{12}H_{14}O_2$ ; MW, 192.26; MP, 93-96°C; Water content, 0.5% max; Purity, 98% min; Solubility, in alcohols, ketones, esters and hydrocarbons; insoluble in water; yellowish-white crystals. Chemical properties: reactive carboxylic acid group may be converted to salts, acid chloride, amide, esters, nitrile and anhydride. Suggested uses: pharmaceutical intermediate; possible interest to agricultural, perfume, flavor, petroleum and plastic industries. Introduced as: new chemical product. Availability: laboratory quantities. Benzol Products Co.

## PTHALEINCOMPLEXONE

$C_{12}H_{10}N_2O_2$ ; MW, 96.56; Purity, analytical grade; Solubility, readily in presence of sodium acetate or ammonium hydroxide; insoluble in pure water; dark reddish-brown powder. Suggested uses: metal indicator for EDTA titration of metals both on macroscale and microscale. Introduced as: product with new degree of availability. Availability: laboratory quantities and semicommercial quantities. Matheson Co. Inc.

## PROPYL ACETATE

$CH_3COOC_2H_5$ ; MW, 102.14; Sp.G. 0.8883 @ 20/20°C; Freezing P., -95°C; BP, 101.6°C @ 760 mm HG; Flash P., 65°F; RI, 1.3847 @ 20/D; Water content, 0.1 wt%; Solubility, wt% in water @ 20°C, 2.0; Pt-Co, 15; Acidity, wt% 0.01; Distillation, 760 mm Hg; IBP 98°C; DP, 105°C; Suspended matter, substantially free; Vapor pressure, 24.9 @ 20°C. Suggested uses: solvent for lacquers and other coatings, antibiotic extractions, acetic acid separations, and coalescing aid for emulsion paints. Introduced as: new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

## n-PROPYL CHLOROTHIOFORMATE

$C_3H_7SCOCI$ ; MW, 138.6; Sp.G. 1.134 @ d 30/4; BP, 155°C @ atm with slight decomposition; 89.5°C @ 90 mm; Flash P., 145°F; RI, 1.4758 @ 20/D; Purity, 97-98%; Solubility, miscible with aromatic and aliphatic hydrocarbons, acetone and ethers; colorless to slightly yellow liquid. Chemical properties: air and light stable; reacts with compounds containing hydroxyl, amino and mercaptide groups. Suggested uses: reactive intermediate for producing herbicides, biocides, peptides, pharmaceuticals, plastics, and ureas. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Stauffer Chemical Co., Market Development Dept.

## R-75072

[dried hydrous zirconia—(amorphous)]

ZrO<sub>2</sub>·x H<sub>2</sub>O (ZrO<sub>2</sub> includes 2% HfO<sub>2</sub>); Constituents: zirconium dioxide plus water. MW, variable; MP, 4900°F; Water content,

10-20%; Purity, technical grade; Solubility, insoluble in water; white powder. Chemical properties: approx 240 M<sup>2</sup>/GM surface area. Suggested uses: catalyst, absorbant, filler for plastics. Introduced as: new chemical product. Availability: semicommercial quantities. National Lead Co., Titanium Alloy Div.

## RUBIDIUM PERCHLORATE

RbClO<sub>4</sub>; Purity: reagent grade; white, crystalline solid. Introduced as: new chemical product. Availability: laboratory quantities. G. Frederick Smith Chemical Co.

## SILVER-o-VANADATE

Ag<sub>3</sub>VO<sub>4</sub>; MW, 438.59; Solubility, soluble in nitric acid and ammonia; insoluble in water; yellow crystalline powder. Suggested uses: catalyst. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

## SM-30 SILICA-MAGNESIA FLUID CRACKING CATALYST

Constituents: 28% MgO on SiO<sub>2</sub> base. White, free-flowing powder, microspherical particles: controlled particle size distribution. Suggested uses: cracking of petroleum gas oil. Introduced as: new chemical product. W. R. Grace & Co., Davison Chemicals Div.

## SODIUM GLUCOHEPTONATE

$C_7H_{13}O_6Na$ ; MW, 248.2; Water content, 2.0% max; Purity, 97.5% min; light tan crystalline powder; or 25% soln. Suggested uses: sequestering of iron, calcium and other polyvalent metals; bottle washing; alkaline rust removal, paint stripping and aluminum etching. Introduced as: significantly new grade. Availability: commercial quantities. Pfister Chemical Works.

## SODIUM GLUCONATE

$NaC_6H_{11}O_7$ ; white crystals; Chemical properties: produced by catalytic air oxidation for the first time; trace elements common in fermentation produced products not present. Suggested uses: sequesterant for cleaning compounds. Introduced as: significantly new grade. Availability: commercial quantities. Cowles Chemical Co.

## SODIUM MANDELATE (sodium phenylhydroxyacetate)

$C_8H_7NaO_3$ ; MW, 174.13; Solubility, in alcohol; very in water; white crystalline powder. Introduced as: new chemical product. Availability: semicommercial quantities. City Chemical Corp.

## SULFAMIDE

$H_4N_2SO_2$ ; MW, 96.11; Density, 1.611 gm/cc; decomposes above MP into ammonia and sulfamide; above 250°C complete decomposition takes place to sulfur acids and ammonia; MP, 85-93°C, Lit. 91-5°C; Solubility, freely in water and hot alcohol; sparingly in cold alcohol; pale yellow to white crystals. Chemical properties: similar to urea in many of its reactions, except that it is more acidic and can act as a dibasic acid. Introduced as: new chemical product. Availability: semicommercial quantities. Allied Chemical Corp., General Chemical Div.

## 5-SULFO ISOPHTHALIC ACID

$C_8H_6O_7S$ ; Constituents: moisture, salt and traces of mineral acids. MW, 246; % Active, 80-85; Purity, 80-85; cream to off-white powder; strong acid odor. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Alliance Chemical Corp.

## SULFUR DICHLORIDE (95)

SCl<sub>2</sub>; MW, 103.0; Flash P. None; Purity, 95% min; red-brown liquid. Chemical properties: stabilized grade of relatively pure sulfur dichloride; very extended shelf life; undesirable side reactions and unwanted by-products greatly reduced. Suggested uses: chemical reagent; chlorinating agent. Introduced as: significantly new grade. Availability: laboratory quantities and commercial quantities with some lead time. Hooker Chemical Corp., Eastern Chemical Div.

## SULFURYL FLUORIDE

SO<sub>2</sub>F<sub>2</sub>; MW, 102.07; Sp.G. 3.55 @ 15°C;



MP, -120 C; BP, -52 C; Purity, 99.5%; Solubility, 10 g/100 g water @ 9 C; 3 parts; part alcohol at 9 C (by vol); soluble in alkali; insoluble in conc.  $H_2SO_4$ ; colorless gas. Chemical properties: no action on water at 150 F; has no action even at 200 C; HF at dull redness gives a deposit of sulfur; Si slightly decomposes the gas;  $NH_3$  at ordinary temp. forms  $SO_2F_2 \cdot 5NH_3$ ; a stable compound at ordinary temp. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Allied Chemical Corp., General Chemical Div.

#### TAM ZIRCONIUM STEARATE (BASIC)

$Zr_2O_3[O_2C(CH_2)_{16}CH_3]_2$ ; MW, 797.36; Solubility, in gm/100ml sol @ 34 C-4; miscible in all proportions in benzene and carbon tetrachloride, insoluble in water, methyl and ethyl isopropyl alcohols; soft colorless solid, stable in air. Suggested uses: mold lubricant; grease former in petroleum component of pharmaceutical greases, oils and emulsions. Introduced as: new chemical product. Availability: laboratory quantities. National Lead Co., Titanium Alloy Mfg. Div.

#### TENAMENE 4 (N,N'-bis(1,4-dimethylpentyl)-p-phenylenediamine)

$C_{20}H_{34}N_2$ ; MW, 304.5; SpG, 0.905 @ 60/60 F; MP, -25 F; Flash P, 380 F (C.O.C.); Viscosity, 172 S.U.S. @ 100 F; Solubility, miscible with benzene, toluene, MEK, ethyl acetone; dark liquid. Chemical properties: relatively low order of toxicity. Suggested uses: antioxidant and sweetening catalyst for petroleum stocks. Introduced as: new chemical product. Availability: semicommercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

#### TEREPHTHALALDEHYDE

$C_8H_6O_2$ ; MW, 134.12; MP, 103-105 C; Purity, 95% min; Solubility, at 25 C: acetone 15%; benzene 6%; methanol 46%; tetrahydrofuran 14%; insoluble in water; off-white, crystalline solid. Chemical properties: aromatic dialdehyde. Suggested uses: polymer modification of polyacetals and insolubilization of polyvinyl alcohol; intermediate for pharmaceuticals, dyes, and pigments. Introduced as: new chemical product. Availability: pilot plant quantities. Diamond Alkali Co., Development Dept.

#### 2-TEREPHTHALOYL BENZOIC ACID

$C_{15}H_{10}O_5$ ; MW, 270.25; MP, 233-237 C; Water content, 0.5% max moisture; Purity, 99% min; white to light gray powder. Suggested uses: intermediate in the manufacture of dyestuffs, pharmaceuticals, insecticides and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

#### TEREPHTHALOYL BISACETIC ESTER

$C_{16}H_{14}O_6$ ; MW, 306.32; MP, 70-71 C; Water content, 0.5% max; Solubility, slightly in ether, acetic acid and alcohol; insoluble in water; pale yellow crystals. Suggested uses: intermediate for dyes and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.

#### TETRABROMBISPHENOL A (2,2-bis(3,5-dibromo-4-hydroxyphenyl)propane)

$C_{15}H_{12}Br_4O_2$ ; MW, 543.9; MP, 182 C (pure compound); white crystals. Suggested uses: raw material for self-extinguishing plastics, especially epoxies. Introduced as: product with new degree of availability. Availability: commercial quantities. The Dow Chemical Co.

#### 1,1,3,3-TETRABUTOXYPROPANE

$C_{10}H_{20}O_4$ ; MW, 332; SpG, 0.889 @ 22 C; MP, <-75 C; BP, 295 C; RI, 1.429; colorless liquid. Introduced as: new chemical product. Availability: laboratory quantities. Kay-Fries Chem. Inc., Development Div.

#### 2,3,5,6-TETRACHLORO-p-XYLENE-a,a'-DIAMINE

$C_8H_2N_2Cl_4$ ; MW, 274.00; MP, 142-144 C; Purity, 95% min; Solubility, in chloroform, isopropyl alcohol; slightly in acetone and cyclohexanone; insoluble in water; white dry powder.

Chemical properties: nuclear chlorinated, aromatic diamine. Suggested uses: monomer for polyamides; polyurethanes; quaternary ammonium compounds for cationic surfactants, textile chemicals; agricultural chemicals, antioxidants, ore flotation agents. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

#### 2,3,5,6-TETRACHLORO-p-XYLENE-a,a'-DIOL

$C_8H_2Cl_4O_2$ ; MW, 275.97; MP, 229-230 C; BP, 253-264 C @ 22 mm Hg; Purity, 95% min; Solubility, insoluble in benzene, carbon tetrachloride; insoluble @ 25 C: acetone, methanol; very slightly soluble @ 50 C: ethyl acetate, P-dioxane; white crystalline solid. Chemical properties: nuclear chlorinated, aromatic glycol. Suggested uses: intermediate for polycondensation reactions leading to polyesters, polyethers, polyurethanes. Introduced as: new chemical product. Availability: laboratory quantities. Diamond Alkali Co., Development Dept.

#### TETRADECENE-1

SpG, 0.772 @ 20/20 C; BP, I.B.P. 242.6 95% over at: 253.3 C; Flash P, P-M 230 F; RI, 1.4365 @ n 20/D; Saybolt +30. Suggested uses: chemical intermediate for addition reactions, alkylation, polymerization, copolymerization, etc. normal to olefin double bond. Introduced as: new chemical product. Availability: laboratory quantities. Gulf Oil Corp., Petrochemicals Dept.

#### TETRA(DIMETHYLAMINO)DIBORON

$B_2N_4C_8H_{24}$ ; MW, 197.9; SpG, 9.85/25 C; MP, -40  $\pm$  2 C; BP, 206 C @ 760 mm Hg; Flash P, 83 C (C.O.C.); RI, 1.4683 @ N 22/D; % Active, 99+; Water content, hydrolyze at a moderate rate; Purity, 99+; Solubility, in most organic solvents; colorless liquid; first covalent boron-boron compound ever to be offered. Suggested uses: preparation alkoxydiboron compounds, reducing agent, polymer building block; preparation of boron monoxide, diboron dichloride, etc. Introduced as: new chemical product. Availability: laboratory quantities. U. S. Borax Research Corp., New Product Dev. Dept.

#### TETRAFLUOROHYDRAZINE

$N_2F_4$ ; MW, 104.02; SpG, 1.65; BP, -73.0 C; Purity, 96+%; 99+%; colorless gas; colorless liquid (cryogenic temps.); Triple P, -168.3 C; Critical temp, 36.1 C; Critical pressure, 77 atm.; Heat of formation, -7  $\pm$  2 Kcal/gm-mol. Chemical properties: powerful oxidizer. Suggested uses: chemical intermediate; rocket-fuel component. Introduced as: product with new degree of availability. Availability: commercial quantities. Air Products and Chemicals, Inc., Defense and Space Div.

#### TETRAHYDRO MUQUOL (tetrahydro alloocimenol)

$C_{10}H_{22}O$ ; MW, 158.3; SpG, 0.834-0.851 @ 15/15 C; RI, 1.4345-1.4430 @ n 20/D; Alcohol content, 95%+; water white liquid; Introduced as: new chemical product. Availability: commercial quantities. International Flavors & Fragrances Inc.

#### TETRAMETHYL AMMONIUM CHLORIDE

$(CH_3)_4NCl$ ; MW, 109.60; SpG, 1.1690; MP, decomposes when heated; Water content, <1%; Solubility, in water and alcohol, insoluble in ether; white crystalline solid. Suggested uses: variety of intermediate chemical applications. Introduced as: product with new degree of availability. Availability: semi-commercial quantities. Ansul Chemical Co.

#### TETRAMETHYLETHYLENE (2,3-dimethyl-2-butene)

$C_6H_{12}$ ; MW, 84; SpG, 0.71; MP, -75.4 C; BP, 73.2 C; Flash P, <ambient temp; RI, 1.4121 @ n 20/D; Water content, none; Purity, 95+%; colorless liquid. Chemical properties: typical olefin properties. Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Houdry Process Corp., Development Dept.

#### TEXANOL BENZOATE

(2,2,4-trimethylpentanediol monoisobutyrate benzoate)  
 $C_{19}H_{28}O_4$ ; MW, 320.4; SpG, 1.025 @ 20/20

C; MP -43 F; BP, 75 C @ 10 mm; Flash P, 325 F (C.O.C.); 150 ppm. APHA, liquid; Suggested uses: plasticizer for vinyls. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

#### TEXANOL DIGLYCOLATE [bis(2,2,4-trimethylpentanediol monoisobutyrate) diglycolate]

$C_{28}H_{42}O_8$ ; MW, 507.5; SpG, 1.0398 @ 20/20 C; MP, -15 F; BP, 337 C @ 760 mm; Flash P, 383 F (C.O.C.); RI, 1.4493; J (Gardner), liquid. Suggested uses: plasticizer for vinyls and for acrylic lacquers. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

#### TEXANOL ISOBUTYRATE (2,2,4-trimethylpentanediol diisobutyrate)

$C_{16}H_{30}O_4$ ; MW, 286.4; SpG, 0.9444 @ 20/20 C; MP, -70 C; BP, 280 C @ 760 mm; Flash P, 250 F (C.O.C.); RI, 1.4300 @ 25/D; Purity, 98%; 30 ppm. APHA, liquid; Suggested uses: primary plasticizer for vinyl formulations. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

#### TEXANOL TALLATE (2,2,4-trimethylpentanediol monoisobutyrate tallate)

MW, 480 (determined); SpG, 0.9234 @ 20/20 C; MP, -62 F; Flash P, 468 (C.O.C.) RI, 1.4588 @ 25/D; liquid. Suggested uses: secondary plasticizer for vinyls. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Inc., Chemicals Div.

#### THIOLACTIC ACID (2-mercaptopropionic acid)

MW, 106; BP, 85 C @ 5 mm; Purity, 95% min; Suggested uses: intermediate for synthesis; hair-waving agent. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Evans Chemicals, Inc., Technical Div.

#### TIN (ous) PYROPHOSPHATE (stannous pyrophosphate)

$Sn_2P_2O_7$ ; MW, 411.36; Solubility, insoluble in water; white powder; Introduced as: new chemical product. Availability: semicommercial quantities. City Chemical Corp.

#### TRIALLYL ORTHOFORMATE (allyl orthoformate)

$C_7H_{12}O_3$ ; MW, 148; SpG, 0.9404 @ 20 C; BP, 103-105 C @ 28 mm; RI, 1.4401 @ n 20/D; Suggested uses: cross-linking agent. Introduced as: new chemical product. Availability: laboratory quantities. Kay-Fries Chemicals, Development Dept.

#### TRI-n-BUTOXY VANADATE

$(n-C_4H_9O)_3VO$ ; Constituents: 50% in Phillips 130 Solvent. MW, 286.29; Density, 1.033 g/cc @ 20 C; BP, 124 C @ 0.5 mm Hg; Solubility, miscible in hydrocarbons; amber liquid. Chemical properties: hydrolyzes rapidly in the presence of moisture. Suggested uses: as a stereospecific polymerization catalyst and chemical intermediate. Introduced as: product with new degree of availability. Availability: semicommercial quantities, commercial quantities. Stauffer Chemical Co., Anderson Chem. Div.

#### TRICHLOROACETIC ACID ANHYDRIDE

$C_4O_3Cl_6$ ; MW, 308.4; SpG, 1.691; BP, 98 C @ 9 mm Hg; Suggested uses: as an intermediate; excellent source for trichloroacetic group. Introduced as: new chemical product. Availability: semicommercial quantities. Aceto Chemical Co.

#### 2,4,5-TRICHLORONITROBENZENE

$C_6H_2NCl_3O_2$ ; MW, 226.46; Congealing P, 45 C min; Solubility, in carbon disulfide, insoluble in water and alcohol; yellow crystalline solid. Chemical properties: hazardous vapors; avoid breathing and contact with eyes and skin. Suggested uses: in dyes, agricultural and other organic chemicals. Introduced as: new chemical product. Availability: commercial quantities. Pfister Chemical Works.



# NEW CHEMICALS FOR INDUSTRY

## n-TRIDECYL MERCAPTAN (tridecanthiol-1)

$C_{13}H_{26}S$ ; MW, 216.4; SpG, 0.851 @ 20 C; BP, 258-262 C; Solubility, insoluble in water; water white liquid. Suggested uses: polymerization modifier; chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## TRIDECYL PHOSPHITE

$(C_{12}H_{25}O)_3P$ ; MW, 502; SpG, 0.891 @ 25/15.5 C; MP, <0 C; BP, 180 C @ 0.1 mm; Flash P, 455 F (C.O.P.); RI, 1.456 @ 25 C; Viscosity, 11.24 cs @ 100 F; 2.90 cs @ 210 F; Solubility, in ethanol, hexane, benzene, acetone, insoluble in water; water white liquid. Acidity, 0.05% (mgKOH/gm) max. Suggested uses: chemical intermediate; resin plasticizer. Introduced as: product with new degree of availability. Availability: commercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## TRIETHYL ACETIC ACID

$C_6H_{12}O_4$ ; MW, 144.22; Ester content, 0.5% max; Solubility, alkaline solutions and alcohols; slightly in water. Coagulation P, 37 C; white to yellow crystals. Chemical properties: carboxylic acid group may be converted to salts, esters, amide or acid chlorides. Suggested uses: pharmaceutical intermediate; possible use in agricultural, plastic, resin, perfume and flavor industries. Introduced as: new chemical product. Availability: laboratory quantities. Benzol Products Co.

## TRIETHYL ACETONITRILE

$C_6H_{11}N$ ; MW, 125.22; BP, 100-104 C @ 100 mm; Purity, 98% min; Water content, 0.5% max; Solubility, in alcohols, esters & ketones; insoluble in water; colorless to yellow liquid. Chemical properties: nitrile group may be converted to an ester, acid or amide. Suggested uses: pharmaceutical intermediate; possible application in the agricultural, plastic, resin, perfume and flavor industries. Introduced as: new chemical. Availability: laboratory quantities. Benzol Products Co.

## 1,1,3-TRI-2-ETHYLHEXOXY-3-ETHOXYPROPANE

$C_{20}H_{40}O_4$ ; MW, 473; SpG, 0.876 @ 30 C; Sets to glass @ 75 C; BP, approx 325 C; RI, 1.457 @ n 25/D; colorless liquid; Introduced as: new chemical product. Availability: laboratory quantities. Kay-Fries Chemicals, Inc., Development Div.

## TRI (2-ETHYLHEXYL)

### ORTHOFORMATE (2-ethylhexyl orthoformate)

$C_{25}H_{52}O_3$ ; MW, 400; SpG, 0.8656/17 C; BP, 168-172 C @ 1 mm; RI, 1.4426 @ n 17/D; colorless liquid. Suggested uses: dehydrating agent. Introduced as: new chemical product. Availability: laboratory quantities. Kay-Fries Chemicals, Inc., Development Dept.

## TRI-n-HEXYLAMINE EC 1658

$C_{18}H_{39}N$ ; MW, 269.50; SpG, 0.803; BP, 290-310 C; Flash P, 132 C; RI, 1.442-1.445; % Active, 99; Viscosity, 3.99 cp @ 25 C; Water content, in oil; 0.47% in water; water white liquid. Suggested uses: flotation agent; replacement for fatty amines; intermediate for amides, nitrosamine, amine oxide. Introduced as: new chemical product. Availability: semi-commercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## TRIHYDROXY DIPHENYL

### (2,3,4-biphenyltriol)

$C_{12}H_{10}O_3$  (90+%) Constituents: 90-92% 2,3,4-trihydroxydiphenyl, 4-5% dihydroxydiphenyls. MW, ca. 202; MP, softens @ 56 C; flows @ 80-90 C; BP, 220-270 C @ 1 mm; % Active, 90-92; Solubility, in aqueous sodium hydroxide and in boiling water (ca. 10%); yellow glassy solid; yellow resin particles or solid. Chemical properties: highly reactive with formaldehyde; reactive with ketones and hemic esters, can be esterified, carboxylated, sulfonated, sulfurized, alkylated to produce various phenolic based derivatives. Suggested uses: intermediate or additive for phenolic and urea

resin manufacture; for plasticizers, fungicides, water-proofing agents, lubricant additives, detergents, tanning agents, antioxidants, and UV light stabilizers. Introduced as: new chemical product. Availability: semi-commercial quantities. Koppers Company, Inc., Chemicals & Dyestuffs Div.

## TRILAURYL TRITHIOPHOSPHITE

$[CH_3(CH_2)_{11}S]_3P$ ; MW, 634; SpG, 0.9160 @ 25/15.5 C; MP, 15 C; Flash P, 398 F (C.O.P.); RI, 1.4988 @ 25 C; Acid no. 0.32 (mgKOH/g); Viscosity, 24.7 cs @ 100 F; 9.8 cs @ 160 F; 5.7 cs @ 210 F; Purity, 93.8%; water white to very slightly yellow liquid. Chemical properties: stabilizer against discoloration of resinous materials. Introduced as: new chemical product. Availability: semi-commercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## 2,2,4-TRIMETHYL-3-HYDROXY-3-PENTENOIC ACID, $\beta$ -LACTONE

$C_8H_{14}O_3$ ; MW, 140.18; MP, -18.15 C; BP, 170 C @ 730 mm; Flash P, 145 F (T.O.C.); RI, 1.4388 @ 20/D; Viscosity, 33.3 @ 0 C, S.U.S.; Purity, 99%; Solubility, miscible with acetone, ethanol, diethyl ether, benzene, naphtha; 10 ppm. APHA, liquid; Suggested uses: chemical intermediate. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

## TRIMETHYLOLPROPANE DIALLYL

### ETHER

#### (2-ethyl, 2-hydroxy methyl-1,3-diallyloxy propanediol)

$C_{12}H_{22}O_3$ ; MW, 214 (theoretical); SpG, 0.937; Freezing P, -50 C; B range, 257-260 C @ 760 mm; Water content, wt %, 0.10; Solubility, methyl alcohol, butyl alcohol, acetone, benzene and ethyl acetate; insoluble in water. Platinum-cobalt units, 10; Acid no, 0.07 @ mgKOH/g; Hydroxyl value, wt %, 7.6; Iodine no, 218 @ g/100g. Chemical properties: bi-functional character provides a site for typical reactions of the primary hydroxyl and allyl groups, leading to polyesters, polyethers and vinyl type polymers. Suggested uses: numerous applications in manufacture of surface coatings, polyurethane plastic foams, elastomers and adhesives. Introduced as: new chemical product. Availability: laboratory quantities. Celanese Chemical Co.

## TRIMETHYLOLPROPANE MONOALLYL

### ETHER

#### (2-ethyl 2-allyloxymethyl propanediol-1,3)

$C_9H_{18}O_3$ ; MW, 174 (theoretical); SpG, 1.022; Freezing P, <-10 C; B range, 264-267 C @ 760 mm; Water content, wt %, 0.10; Solubility, methyl alcohol, butyl alcohol, acetone, benzene and ethyl acetate; slightly in water; Platinum-cobalt units, 10; Iodine no, 136 g/100g; Hydroxyl value, wt %, 19.0; Acid no, 0.02 @ mg KOH/g. Chemical properties: bi-functional character provides a site for typical reactions of the primary hydroxyl and allyl groups leading to polyesters, polyethers and vinyl type polymers. Suggested uses: numerous applications in the manufacture of surface coatings, polyurethane plastic foams, elastomers, and adhesives. Introduced as: new chemical product. Availability: laboratory quantities. Celanese Chemical Co.

## TRIOCTADECYL PHOSPHITE

$(C_{16}H_{33}O)_3P$ ; MW, 838; Density, 0.94 @ 25/4 C; MP, 45-47 C; Purity, >95%; white waxy solid. Chemical properties: undergoes reactions of trialkyl phosphates. Suggested uses: stabilizer for polyolefins, vinyl resins and rubbers. Introduced as: new chemical product. Availability: commercial quantities. Hooker Chemical Corp., Product Development Div.

## TRIOCTYL PHOSPHITE

### [tris(2-ethylhexyl)phosphite]

$(C_8H_{17}O)_3P$ ; MW, 418; SpG, 0.8967 @ 25/15.5 C; MP, becomes glassy at very low temp; BP, approx 100 C @ 0.01 mm; Flash P, 340 F (C.O.P.); RI, 1.4507 @ 25 C; Purity, 90%; Solubility, in ethanol, hexane, benzene and acetone; insoluble in water; clear, light straw colored liquid. Suggested uses:

resin plasticizer. Introduced as: new chemical product. Availability: semi-commercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## TRIPHENYLANTIMONY

$(C_6H_5)_3Sb$ ; MW, 353.1; MP, 51-52 C; BP, 337 C @ 760 mm Hg; Purity, 34.5% Sb; Solubility, in benzene, ether, chloroform, carbon disulfide, glacial acetic acid; insoluble in water; white, crystalline solid. Density, 1.4998; Crystal form, triclinic; crystal habit, needles; Decomposition temp, 513 F. Chemical properties: may be halogenated to form triphenylantimony dichloride or other dihalide; will react with a variety of reagents to form antimony salts. Suggested uses: catalyst for conversion of trienes to aromatic and hydroaromatic compounds; oxidation inhibiting additive for mineral lube oils; wear inhibitor in gasolines containing iron pentacarbonyl; activator in curing of polyepoxides; flame retardant in transparent plastics. Introduced as: new chemical product. Availability: commercial quantities. Metal & Thermic Corp., Commercial Development Dept.

## TRIPHENYLPHOSPHORUS

$C_{18}H_{15}P$ ; MW, 262.28; MP, 80.5 C  $\pm$  1.5 C; BP, 377 C @ 760 mm Hg; Flash P, 180 C (ASTM O C); Viscosity, free flowing; Purity, 99% min; Solubility, in benzene, toluene, acetone and carbon tetrachloride; insoluble in water; white to light tan crystals; Bulk density, 45 lbs/cu ft, 11.7% phosphorus typical. Chemical properties: excellent shelf stability. Suggested uses: in preparation of Wittig reagent and also in Wittig reaction for olefin synthesis. Introduced as: new chemical product. Availability: commercial quantities. Metal & Thermic Corp., Commercial Development Div.

## TRIS(HYDROXYPROPYL)GLYCERINE

$C_{12}H_{26}O_3$ ; MW, 266; SpG, 1.07-1.09; Viscosity, 250-300 cs; Water content, <0.5%; Solubility, in water, ethanol and benzene; insoluble in carbon tetrachloride and n-heptane; water white liquid, max APHA 75. % OH, 19.5-20.5; meets resin grade specifications. Chemical properties: a triol. Suggested uses: coatings, elastomers and base for isocyanate adduct for rigid urethane foam. Introduced as: significantly new grade. Availability: semi-commercial quantities. The Dow Chemical Co.

## TTS-5

### (3,3,3',3'-tetramethyl-1,1'-spiro bi(indan)-5,6,5',6'-tetrol)

$C_{21}H_{24}O_4$ ; MW, 340.2; MP, 300-305 (decomp) C; % Active, 100; Solubility, in acetone and alkali (with dark green color); slightly in ether and acetic acid and 3% in ethanol and petroleum ether, insoluble in water and benzene; light brown crystals. Suggested uses: antioxidant for hydrocarbon fuels and oils, plastics, resins, rubber, accelerator for chloroprene type rubbers; anti-skinning agent for paints and varnishes. Introduced as: new chemical product. Availability: semi-commercial quantities. Koppers Company, Inc., Chemical & Dyestuffs Div.

## UREA, PRILLED

$(NH_2)_2CO$ ; MW, 60.05; MP, 132.7 F; pH, 8.0-9.5; Water content, 0.35% max; Solubility, in water, alcohol, ether, etc.; white free-flowing prills. Biuret, 0.8 wt. % max; Free ammonia, 100 ppm max; Turbidity, 20 ppm max; Chemical properties: purity raised and contaminants reduced. Suggested uses: all urea applications including those previously requiring crystal quality, i.e., bonding, textile, coating and molding resins; as a blowing agent and as a chemical intermediate. Introduced as: significantly new grade. Availability: commercial quantities. Sohio Chemical Co., Chemical Div.

## UREA, REAGENT GRADE

$CH_4N_2O$ ; Constituents: chlorides 0.002% max, sulfate 0.005% max, heavy metals 0.0005% max, iron 0.0005% max, dirt 10 ppm max, magnetic particles none, lint 10 ppm. MW, 60.06; MP, 132-133 C; Solubility, in water; 0.02% max insoluble in alcohol; Residue on ignition, 0.020%; Biuret content, 0.006%. Suggested uses: parenteral pharmaceutical. Introduced as: significantly new grade. Availability: commercial quantities. American Cyanamid Co., Fine Chemicals Div.



## VANADIUM TRICHLORIDE

$\text{VCl}_3$ ; Constituents: 32.5% vanadium; 67.4% chlorine; <0.02% iron. MW, 157.32; Bulk density, 45-60 lbs/cu ft; MP, none; Purity, 98% min; Solubility, in acetic acid and alcohol; free flowing, deep purple crystalline powder. Chemical properties:  $\text{VCl}_3$  disproportionates to  $\text{VCl}_2$  and  $\text{VCl}_4$  at 300-400 C. Suggested uses: as a stereospecific polymerization catalyst and chemical intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. Stauffer Chemical Co., Anderson Chemical Div.

## XYLENOL ORANGE

(3,3'-bis[N,N-di(carboxymethyl)-amino-methyl]o-cresolsulfonphthalein)

$\text{C}_{31}\text{H}_{32}\text{N}_2\text{O}_{13}\text{S}$ ; MW, 1002.62; Purity, analytical grade; Solubility, in water and alcohol; insoluble in nonpolar solvents; buff powder. Suggested uses: metal indicator for EDTA titration of metals both on macroscale and microscale. Introduced as: product with new degree of availability. Availability: laboratory quantities and semicommercial quantities. Matheson Co., Inc., Matheson Coleman & Bell.

## ZINC FERROCYNANIDE (zinc cyanoferrate)

$\text{Zn}_2\text{Fe}(\text{CN})_6 \cdot 3\text{H}_2\text{O}$ ; MW, 396.77; Solubility, in acids and  $\text{NH}_4\text{OH}$ ; insoluble in water; white to blue-white powder. Introduced as: new chemical product. Availability: semicommercial quantities. City Chemical Corp.

## ZINC STEARATE CERTIFIED GRADE A

MW, approx 335; SpG, approx bulk 4.8 lb/cu ft; Softening range, 118-123 C; pH, neutral to litmus; Water content, .2%; Purity, acceptable for approved food additive use; heavy metals particularly controlled; Solubility, in benzene and xylene; insoluble in water, alcohol, and ether. Fine, white, bulky powder; 99.95% through 325 mesh; produced from fatty acids which are certified to be obtained from edible fats and oils, free from chick edema factor. Suggested uses: molded plastics, resin films and laminates, rubber, and industrial lubricant or water repellent applications. Introduced as: significantly new grade. Availability: commercial quantities. Mallinckrodt Chemical Works, Process Chemicals Div.

## ZINC STEARATE TECHNICAL HEAVY

MW, approx 335; SpG, approx bulk 16 lb/cu ft; MP, 122-123 C; pH, neutral to litmus; Water content, typically <1.0%; Purity, commercial (USP also available); Solubility, in benzene, xylene and toluene. Fine, white powder, 96% min through 200 mesh. Chemical properties: the increased density, 11/3 of the conventional zinc stearate bulk suggests new and varied applications. Suggested uses: internal and external resin lubricant; pigment dispersion aid; wherever excessive dusting has been a problem. Introduced as: significantly new grade. Availability: commercial quantities. Mallinckrodt Chemical Works, Industrial Div.

## ZINC TETRAMINE FLUOBORATE

$[\text{Zn}(\text{NH}_3)_4](\text{BF}_4)_2$ ; MW, 307.14; SpG, 1.825; MP, decomposes; BP, decomposes; Water content, none; Purity, 99.5%; Solubility, in water; insoluble in ammonia with  $\text{BF}_4$ ; well-formed white crystals. Chemical properties: can be crystallized from saturated water solution by cooling; stable in air; thermal decomposition begins around 200 C and is irreversible. Introduced as: new chemical product. Availability: commercial quantities. Allied Chemical Corp., General Chemical Div.

## ZIRCONIUM TETRAACETYL-ACETONATE

(zirconium tetrapentanedionate)

MW, 487.63; SpG, 1.415 @ 25 C; MP, 194 - 195 C; colorless crystalline solid; Introduced as: new chemical product. Availability: laboratory quantities. National Lead Co., Titanium Alloy Mfg. Div.

## ZIRCONIUM TETRABROMIDE

$\text{ZrBr}_4$ ; MW, 410.88; MP, under pressure 450 C sublimates at one atm 357 C; colorless crystalline solid; decomposed easily by moisture; a Strong Lewis Acid. Introduced as: new chemical product. Availability: laboratory quantities. National Lead Co., Titanium Alloy Mfg. Div.

## NEW SPECIALTIES

### ADOGEN 551 (tall oil fatty diamine)

$\text{RNHCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; Suggested uses: corrosion inhibitor formulations, asphalt additions, dispersants, curing agent. Introduced as: new chemical product. Availability: semicommercial quantities. Archer-Daniels-Midland Co., Development Dept.

### AEROTEX ANTISTATIC CSN CONC. (fatty quaternary complex)

% Active, 50; SpG, 8.4 lb/gal; pH, 4-5; Solubility, readily in water; pale yellow liquid. Chemical properties: antistatic properties, durable to dry cleaning. Suggested uses: static control on synthetic or resin-treated cellulosic fabrics. Introduced as: significantly new grade. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

### AEROTEX REACTANT NO. 1; NO. 2 (non-resinous cellulose reactant)

% Active, 50; SpG, 9.3 lb/gal; 9.4 lb/gal; pH, 7.5-8.5; Solubility, readily in water; clear, water-white liquid. Chemical properties: high wet and dry wrinkle recovery on cotton fabrics; low chlorine retentive properties; non-yellowing (No. 2). Suggested uses: durable wash-n-wear finishes on woven goods, shrinkage control of knit goods. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

### AEROTEX STA-TUFF ACCELERATOR B (inorganic salt)

% Active, 28; SpG, 10.7 lb/gal; pH, <1.0; Solubility, readily in water; clear, light yellow liquid. Suggested uses: accelerator for Aerotex Sta-Tuff Resin A. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

### AEROTEX STA-TUFF RESIN A (special amino-formaldehyde complex)

% Active, 80; SpG, 10 lb/gal; pH, 8.5-9; Solubility, readily in water; clear, viscous liquid. Chemical properties: inhibits growth of cellulose-decomposing microorganisms; cures at room temperature. Suggested uses: rot-proofing of cellulose textiles without loss of tensile strength due to treatment. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

### AGENT AT-460

SpG, 1.084; Flash P, >450 F; RI, 1.483; Pour P, 10-20 C; Water content, 1.0-1.5%; Solubility, in water, ethanol, xylene; clear amber, viscous liquid. Chemical properties: low-foaming nonionic surfactant with good detergent properties; good color stability in contact with caustic flake and powders. Suggested uses: mechanical dishwashing formulations; dedusting caustic soda. Introduced as: new chemical product. Availability: semi-commercial quantities. General Aniline & Film Corp., Antara Chemicals.

### AGENT AT-517

SpG, 1.070; Flash P, >450 F; RI, 1.488; Pour P, -5 to -10 C; Water content, 1.0%; Solubility, in ethanol, xylene; dispersible in water; clear amber, viscous liquid. Chemical properties: nonionic surfactant, low-foaming at moderate temperatures; good surfactant properties; good color stability in contact with caustic soda. Suggested uses: low-temperature spray-cleaning of metals; paper-mill-felt washing; dewatering of pulp; dedusting of caustic soda. Introduced as: new chemical product. Availability: semicommercial quantities. General Aniline & Film Corp., Antara Chemicals.

### AGENT AT-539 (substituted acrylonitrile)

BP, 200 C @ 0.1 mm Hg; Solidification P, -10 C; Purity, 95-98%; Solubility, in methanol, ethanol, ethyl acetate, methyl ethyl ketone, hexane, toluene, and mineral spirits; insoluble

in water; light-yellow oil. Chemical properties: absorbs ultraviolet radiation, particularly at 300 mμ; does not complex with metallic driers; stable to bases up to pH 10; does not react with secondary or tertiary amines. Suggested uses: ultraviolet-radiation absorber for paint, varnish, polyethylene, and rigid polyvinyl chloride. Introduced as: new chemical product. Availability: semicommercial quantities. General Aniline & Film Corp., Antara Chemicals.

### AGENT RE-960 (free acid of a complex organic phosphate ester)

SpG, 1.188-1.211 @ 40 C; Pour P, 47-48 C; % Active, 95; pH, 2.1-2.5 in 10% soln; Water content, approx. 5%; Solubility, in water & ethylene glycol; light-tan waxy solid. Chemical properties: anionic emulsifier; promotes improved freeze-thaw and mechanical stability in polyvinyl acetate and acrylic latices when used as the primary emulsifier in polymerization of same. Suggested uses: emulsion polymerization. Introduced as: new chemical product. Availability: semicommercial quantities. General Aniline & Film Corp., Antara Chemicals.

### ALBUMIN (human origin)

Water content, 2-3%; Purity, 99%; Solubility, in water; white amorphous powder; salt poor, low in globulins. Suggested uses: blood extender and diagnostic agent. Introduced as: product with new degree of availability. Availability: semicommercial quantities. American Cyanamid Co., Fine Chemicals Dept.

### ALFOL ALCOHOLS (normal primary alcohols)

$\text{C}_6\text{H}_{13}\text{OH}$  to  $\text{C}_{26}\text{H}_{53}\text{OH}$ ; Constituents: both pure compounds and mixtures of two or more alcohols. Chemical properties: first time available from a synthetic source (ethylene). Suggested uses: detergents, plasticizers, cosmetics, herbicides, synthetic lubricants, lube oil additives. Introduced as: significantly new grade. Availability: commercial quantities. Continental Oil Co., Petrochemical Div.

### ALIPAL EO-526 (sodium salt of a sulfated alkyl-phenoxy poly(ethyleneoxy)ethanol)

Constituents: NaCl: 2.5% max; ethanol: 5% min. MW, 586; % Active, 58 min; Solubility, in water; hazy, amber liquid (VCS-10 max). Chemical properties: anionic emulsifier having good detergency, high foamability, and stability to alkali. Suggested uses: in heavy-duty all-purpose liquid cleaners. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

### ALIPAL RC-335 (ammonium salt of sulfated dodecyl-phenoxy poly(ethyleneoxy)ethanol)

Constituents: solids: 60-62%; ethanol: 12-15%. SpG, 1.04-1.08; BP, 65 C; % Active, 57 min; pH, 7±1; Solubility, miscible with water; clear, slightly viscous liquid. Chemical properties: anionic surfactant having good compatibility with alkaline builders and high foamability. Suggested uses: opaque, light-duty dishwashing and fine-fabrics formulations; hair shampoos. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

### ALOX 2028 (special esterified petroleum oxidate)

SpG, 0.97 @ 60 F; MP, 86 F; Flash P, 335 F; % Active, 100; Water content, 0%; Cone penetration, >360; Solubility, in mineral oil, hydrocarbon solvents; dark brown solid. Chemical properties: alkali-resistant, non-emulsifying corrosion inhibitor. Suggested uses: water-displacing rust preventative; to dry and protect metals after alkali cleaning. Introduced as: new chemical product. Availability: commercial quantities. Alox Corp.



# NEW CHEMICALS FOR INDUSTRY

## AM-9 CHEMICAL GROUT

Constituents: acrylamide, N,N'-methylenebisacrylamide. Viscosity, 1.2 cps; white powder. Chemical properties: polymerizes when catalyst system is added; forms stiff impermeable gel; gel time can be accurately controlled over wide range; penetrates soils even in silt range; solidifies even in moving water. Suggested uses: soil stabilizer. Introduced as: product with new degree of availability. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals, Explosives & Mining Chemicals Dept.

## AMBIFLO TL-1; TL-2

Constituents: formulation based on polyalkylene glycol. Viscosity, TL-1, Kinematic 162 cs @ 100 F; TL-2, 353 cs @ 100 F; Solubility, readily in cold water; pale, straw-colored liquid. Chemical properties: high temperature stability; non-staining; forms no gummy residues. Suggested uses: wool lubricant. Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

## AMINE ODT

### (dodecyl diethylene triamine)

$C_{16}H_{35}N_3$ . MW, 270.5; SpG, 0.896 @ 25 C; BP, 140-200 C @ 28 mm; RI, 1.48; pH, 10-11; Viscosity, 78 cps @ 25 C; Water content, none; Purity, 99-95%. Solubility, in organic solvents and mineral oils; red liquid. Chemical properties: displaces water from metal surfaces and maintains oil films. Suggested uses: in oils to prevent rusting, corrosion, foaming and bacteria. Introduced as: product with new degree of availability. Availability: commercial quantities. Roberts Chemicals, Inc.

## AMMONYX LMD

### (lauryl myristyl amine oxide)

% Active, 30; Solubility, miscible in water; colorless liquid; Chemical properties: good soil suspending and foam stabilizing characteristics. Suggested uses: in liquid detergent formulations. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

## AMMONYX 27

### (tallow dimethyl benzyl ammonium chloride)

% Active, 50; Solubility, in water and other solvents. Suggested uses: in demulsification; germicides; industrial water treatment. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

## AMMONYX 200

### (phenyl trimethyl ammonium chloride)

% Active, 99.5; white powder. Suggested uses: intermediate in manufacture of pharmaceuticals and dyestuffs; excellent mythylating agent, polymerization inhibitor for polyesters. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

## ANSAR CACODYLIC ACID (dimethyl arsinic acid)

$(CH_3)_2AsO_2H$ . MW, 137.99; MP, 200 C; % Active, 60; Water content, 3%; Solubility, 200g/100g water; 36g/100g alcohol; insoluble in ethyl ether. Suggested uses: pasture and home lawn renovation, defoliant, desiccant, selective pre-emergent herbicide, seed fungicide, aquatic weed control. Introduced as: product with new degree of availability. Availability: commercial quantities. Ansil Chemical Co.

## AROCRYL 701-XA3-50

### (thermosetting acrylic copolymer)

Viscosity, (G-H) X-Z, Stokes 12.9-22.7; Gardner Color '53 standard 3 max, liquid; 8.20 lbs/gal; Solvent, xylol/methyl cellosolve, 4:1. Chemical properties: thermosetting resin, outstanding chemical resistance. Suggested uses: appliance finishes. Introduced as: new chemical product. Availability: commercial quantities. Archer-Daniels-Midland Co., Resin Dept.

## AROGUMS

### (oxidized potato starches)

pH, 5.5, 6.0, 7.0, 7.2; Viscosity, 60, 65, 80, 130 cps; Chemical properties: long texture imparts superior film structure for surface sizing and coating operations. Suggested uses: in paper industry—tub, size press, and calender

sizing. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Paper Div.

## AROTHANE 156-XA1-50

### (urethane moisture cure resin solution)

% Active, NCO 4-5; Viscosity, (G-H) O-Y, Stokes 3.7-18; Water content, none; Purity, pure isocyanate polymer; Gardner '53 color 3 max, liquid; Wt/gal 8.55, solvent a mix of xylol and cellosolve acetate. Chemical properties: provides chemical resistant coatings with high abrasion characteristics. Suggested uses: marine coatings, floor finishes, furniture coatings. Introduced as: new chemical product. Availability: commercial quantities. Archer-Daniels-Midland Co., Resin Dept.

## BARRETT RIGID URETHANE FOAM INSULATION

Constituents: genetron blown, rigid polyurethane foam. SpG, .029 @ 1.8 lbs/cu ft; K, 0.15 BTU @ 70 F mean temp; golden rigid foam. Chemical properties: inert, low permeability, low thermal conductivity. Suggested uses: low temperature insulation. Introduced as: new chemical product. Availability: commercial quantities. Allied Chemical Corp., Barrett Div.

## BARRETT URETHANE ROOF INSULATION

Constituents: genetron blown, rigid polyurethane foam between two sheets of asphalt roofing membrane approx 1 lb/sq ft @ 1" thickness; C value, 13 BTU F/hr sq ft for 1" of foam and two base sheets; rigid panels, golden foam core; low permeability, low thermal conductivity. Suggested uses: roof insulation directly over roof decks. Introduced as: new chemical product. Availability: commercial quantities. Allied Chemical Corp., Barrett Div.

## BIOMET 66

SpG, 1.016 at 25 C; Freezing P, 14 C; % Active, 25; Solubility, 50% in water, ethylene glycol, methanol, ethanol, isopropanol; insoluble in mineral spirits or benzene; amber to dark amber liquid. Chemical properties: microbicide. Suggested uses: paper mill slime control agent; secondary oil recovery injection water; cooling tower water. Introduced as: new chemical product. Availability: commercial quantities. Metal & Thermit Corp., Commercial Development.

## B-K EGG WASH

Constituents: chlorinated, modified phosphate. Suggested uses: cleaner and sanitizer for commercial egg producers. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## BLANCOPHOR AM-80

Solubility, in acrylic dope; readily dispersed in a dilute solution of acetic acid; pale-yellow, finely ground powder. Chemical properties: affinity for acrylics; fluoresces a blue-white hue under ultraviolet radiation; good light stability. Suggested uses: fluorescent brightener for acrylic fibers; may be applied by exhaust or dope-dyeing methods. Introduced as: new chemical product. Availability: laboratory quantities. General Aniline & Film Corp., General Dyestuff Co.

## BLANCOPHOR CB-32

### (stilbene derivative)

pH, 9 or higher in 1% soln; Solubility, in water in all proportions; light-straw to light-amber liquid. Chemical properties: affinity for cellulose; fluoresces a light-blue-green hue under ultra violet radiation; slow exhaust; good build-up; compatible with conventional finishing agents; gives very level dyeings. Suggested uses: fluorescent brightener for application in the wet-processing of textiles; may be applied by exhaust or padding methods. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., General Dyestuff Co.

## BLANCOPHOR CN-77

### (stilbene derivative)

Solubility, <0.01% in water; fine, very-light-yellow powder; particle size, 99% 60-mesh. Chemical properties: affinity for cellulose and, to a lesser degree, nylon; neutral

blue fluorescence; moderately fast exhaust; good build-up; similar to Blancophor CN-76, but much more highly refined and improved. Suggested uses: fluorescent brightener for anionic detergent formulations for brightening household fabrics, has a whitening effect on powdered heavy-duty detergents themselves. Introduced as: significantly new grade. Availability: commercial quantities. General Aniline & Film Corp., General Dyestuff Co.

## BLANCOPHOR MO-89

Solubility, in polypropylene melt; readily dispersed in a dilute solution of Peralgal ST; pale-yellow, finely ground powder. Chemical properties: affinity for polyolefins; blue-white hue of fluorescence under ultraviolet radiation; good compatibility with polyolefins; outstanding light fastness; stable to the temperatures normally encountered in polyolefin melt procedures. Suggested uses: fluorescent brightener for polyolefin films and fibers; may be applied by exhaust and by incorporation into the melt. Introduced as: new chemical product. Availability: laboratory quantities. General Aniline & Film Corp., General Dyestuff Co.

## BRILLIANT TONING MAROON CP-1480

### (permanent red 2B)

SpG, 1.58; Purity, commercial; medium maroon shade powder. Chemical properties: heat stable, resistant to greases, fats and waxes and to bleeding, migration or crocking in plasticizers. Suggested uses: in all types of printing inks (except water flexographic); in coloring natural and synthetic rubber, vinyl resins, polystyrene and polyethylene. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## CELCON

### (acetal copolymer based on trioxane)

SpG, 1.4; MP, 162 C; Solubility, insoluble in organic solvents below 60 C; natural translucent white plus standard colors; pellets. Chemical properties: high mechanical strength and toughness; long-term creep resistance; easy processability; excellent electrical properties, solvent and abrasion resistance. Suggested uses: aerosol containers; parts and components for automotive, appliance, plumbing and business machine applications; sheet, rod and tubing, electrical components. Introduced as: new chemical product. Availability: commercial quantities. Celanese Polymer Co.

## CELLUGUARD 150

Constituents: water-glycol fluid. SpG, 1.055; Flash P, none while water content is maintained; Pour P, -25 F; pH 9; Viscosity, 150 SUS @ 100 F; Viscosity index, +160; Water content, 50%; red liquid. Chemical properties: excellent lubricity and fire resistance. Suggested uses: hydraulic systems. Introduced as: new chemical product. Availability: commercial quantities. Celanese Chemical Co.

## CIODRIN INSECTICIDE

### [ $\alpha$ -methylbenzyl-3-(dimethoxyphosphinyloxy)-cis-crotonate]

$C_{14}H_{19}O_6P$ . MW, 314.3; Solubility, in IPA, ethanol and acetone; slightly soluble in kerosene; miscible in xylene; straw liquid. Suggested uses: experimental insecticide. Introduced as: new chemical product. Availability: laboratory quantities. Shell Chemical Co., Agricultural Chemicals Div.

## CL-104

### (styrene-butadiene latex)

SpG, 0.978; pH, 10.0-10.5; Viscosity, 600 cps, Brookfield #3 Spindle @ 20 rpm; Solids content, 62.5 wt %; white latex. Chemical properties: higher modulus than other SBR foam latices permitting lower density foam. Suggested uses: foam rubber; adhesives applications. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Synthetic Rubber Div.

## CL-205 VINYL ACRYLIC COPOLYMER EMULSION

pH, 4.5  $\pm$  0.5; Viscosity, 600-1200 cps @ 25 C; Solids content, 55  $\pm$  1 wt %; Free monomer content, max 0.5 wt %. Chemical properties: outstanding color acceptance, flow, leveling, and



washability. Suggested uses: in interior and exterior paints. Introduced as: new chemical product. Availability: commercial quantities. Celanese Chemical Company.

#### CL-302 ACRYLIC-BASE TRIPOLYMER EMULSION

SpG, 8.8 lbs/gal; pH, 6.0-7.0; Viscosity, 50-150 cps @ 25°C and pH 7.0; Solids content, 46 ± 0.5 wt %; Monomer content, 0.3 max wt %. Chemical properties: outstanding tint retention and exterior durability; excellent mechanical and shelf stability. Suggested uses: for fast-drying interior flat paints, and for exterior paints. Introduced as: new chemical product. Availability: commercial quantities. Celanese Chemical Co.

#### CONOCO C-60 (sodium dodecylbenzene sulfonate)

$C_{12}H_{25}SO_3Na$ . MW, 345; % Active, 60; pH, 7.0; Water content, 35.0; white slurry. Suggested uses: intermediate for liquid detergents. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Continental Oil Co., Petrochemical Div.

#### CORRAGEL

Constituents: attapulgus clay, activated (67.0%  $SiO_2$ ; 12.5%  $Al_2O_3$ ; 11.0%  $MgO$ ; 4.0%  $Fe_2O_3$ ; 2.5%  $CaO$ ; 3.0% other). Bulk density, 30-35 lbs/cu ft; Volatile matter, 22 wt %; MW, wt/gal, 19.70 lbs; SpG, 2.36; pH, 7.5-9.0; Water content, 12 wt %; light cream, needle-like clay particles of 0.12-0.14 microns average size. Chemical properties: highly sorptive crystalline clays in powder form. Suggested uses: control of viscosity for corrugating adhesives. Introduced as: new chemical product. Availability: commercial quantities. Minerals & Chemicals Philipp Corp.

#### CYANATEX SOFTENER C

Constituents: fatty quaternary compound. % Active, 85; SpG, 6.8 lb/gal; pH, 3-4 (diluted); Solubility, readily in hot water; tan paste. Chemical properties: antistatic properties at low concentrations. Suggested uses: lubrication and static control on synthetic fibers. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

#### CYANATEX SOFTENER RW

Constituents: mixture of sulfonated synthetic esters. % Active, 35; SpG, 8.6 lb/gal; pH, 5; Solubility, readily in warm water; soft, white paste. Chemical properties: softening and rewetting properties at low concentrations. Suggested uses: towel finish, pretreatment for compressive shrinkage processing. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

#### CYANOX LF

Constituents: modified alkylated phenol. SpG, 1.062; % Active, 100; Solubility, in acetone, ethylene dichloride, n-heptane; clear light amber liquid; very slight phenolic odor; slightly viscous. Suggested uses: non-discoloring, non-staining antioxidant for natural and synthetic rubber. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals, Rubber Chemicals Dept.

#### DAREX EVERFLEX CA (vinyl acetate copolymer emulsion)

pH, 4.0-6.0; Viscosity, 1500-3000 cps. Water content, 44-46%; white. Chemical properties: exhibits extremely good acceptance of a wide variety of tinting colors without use of carboxylic amounts of emulsifier or loss of water persistence. Suggested uses: all-purpose vehicle for latex paints. Introduced as: new chemical product. Availability: commercial quantities. W. R. Grace & Co., Dewey & Almy Div.

#### DEFOAMER 333

Wt/gal: 6.8-6.9 lbs; SpG, 0.82-0.83; Flash P, 225 F min; % Active, 100; pH, 6.2-6.8 @ 1% dispersion; crystal-clear liquid. Chemical properties: contains no silicones, will not separate. Suggested uses: anti-foaming agent for emulsions of all types. Introduced as: new chemical product. Availability: commercial quantities. Troy Chemical Co.

#### DOW CORNING 113 (silicone-glycol copolymer)

SpG, 1.07; % Active, 100; Viscosity, 350 cs; Solubility, in alcohols, glycols, water, amines, crude isocyanates; light straw liquid. Chemical properties: compatible with urethane ingredients; less sensitive to variations in mixing; will not cause gelation in isocyanate prepolymers or isocyanates. Suggested uses: additive for rigid polyurethane foams. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

#### DOW CORNING 780

Constituents: silicone rubber gum (special type); fillers. MP, none; Viscosity, caulking grade; Water content, nil; Solubility, in most aliphatic, aromatic and chlorinated solvents; Standard colors, clear, white, black, gray. Chemical properties: nonslumping, one-component sealant, highly weather resistant; in service (after vulcanization by atmospheric water vapor) will not change color, or bleed, crack or soften within 5-year warranty period. Suggested uses: sealant for curtain wall construction and similar applications. Introduced as: product with new degree of availability. Availability: commercial quantities. Dow Corning Corp.

#### DOW CORNING C-2-0146

% Active, 100; Solubility, in most aliphatic and aromatic hydrocarbons and chlorinated solvents; translucent white silicone liquid. Chemical properties: produces urethane sponge with cell structure like that of natural sponge. Suggested uses: additives for production of urethane sponges. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

#### DOW CORNING FS 1265 FLUID (trifluoropropyl-methyl polysiloxane)

MW, varying with viscosity grade; SpG, 1.24-1.30 (varies with viscosity grade); Flash P, approx 500 F; % Active, 100; Viscosity, 250 cs, 1000 cs, 10000 cs standard grades; Water content, none; Solubility, in most ketones; insoluble in most petroleum oils, fuels, solvents and water; clear white liquid. Chemical properties: serviceable from -40 to 400 F; incompatible with most oils, fuels, solvents, water; excellent lubricity. Suggested uses: lubricating fluid; base oil for greases, defoamer for solvent systems, hydraulic fluid, damping fluid. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

#### DOW CORNING FS 1280 COMPOUND (silica-filled fluorosilicone fluid)

SpG, 1.30; MP, none; Water content, none; Solubility, in most ketones; insoluble in oils, fuels, most solvents and water; translucent, light gray grease. Chemical properties: serviceable from -80 F to 400 F; little or no attack on most rubber seals; good lubricity. Suggested uses: solvent-resistant valve lubricants in applications involving extreme heat or cold; sealing material. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

#### DOW CORNING FS 1290 GREASE (soap-thickened fluorosilicone)

Water content, none; Solubility, in most ketones; insoluble in most fuels, oils, solvents and water; Dropping point, 410 F; evaporation after 24 hours at 300 F—0.9%; opaque white grease. Chemical properties: serviceable from -50 F to 400 F; good lubricity; no effect on most types of seals. Suggested uses: bearing grease. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

#### DOW LATEX 300

Constituents: styrene-butadiene latex. SpG, solids 1.03; % Active, 47; pH, 8.5-10.5; Water content, 53%; white liquid; forms film at room temperature. Chemical properties: interior paint latex with greatly improved application properties and hiding power. Suggested uses: in interior flat wall paints. Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

#### DOW POLYETHYLENE CG 1705-B

Constituents: Dow polyethylene compounded with carbon black. SpG, 0.917, density of base resin; Melt index, 5. Suggested uses: extrusion coating or lamination of construction pa-

pers, agriculture mulch papers, paperboard, cellophane, films, foils and fabrics. Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

#### DOW POLYETHYLENE CG 1608

SpG, 0.916 density; Melt index, 8. Chemical properties: designed for high speed extrusion coatings requiring low coating thicknesses; meets requirements of FDA regulation (Federal Register, June 10, 1961). Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

#### DOW POLYETHYLENE CG 2502; 2504

SpG, 0.925 density; Melt index, 2.4. Chemical properties: increased density with high degree of the excellent extrusion characteristics of low density polyethylene; meets requirements of FDA regulation (Federal Register, June 10, 1961). Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

#### DOW POLYETHYLENE CG 3002

SpG, 0.930 density; Melt index, 1.5. Chemical properties: high density with excellent extrusion coating characteristics; heat distortion temperature is sufficiently high to withstand exposure to boiling water; meets requirements of FDA regulation (Federal Register, June 10, 1961). Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

#### DRAWCOTE 1050

Constituents: borated soap. Chemical properties: dry film lubricant for deep drawing operations. Suggested uses: for drawing operations such as auto bumper forming. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

#### DRI-FILM 144

(solution of a polyalkylsiloxane in hydrocarbon solvent)

SpG, 0.88; Flash P, >80 F; % active, 33; Viscosity, 10 cps; Water content, none; Solubility, hydrocarbon solvent; colorless liquid. Chemical properties: pure silicone resin solution to protect masonry from moisture, cracking, spalling, efflorescence. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

#### DUOX REACTIVE DILUENT (heterocyclic compound with ring oxide structure)

MW, 86; Water content, 0.3% max; Purity, 98.0% min; straw-colored liquid. Chemical properties: reacts readily, at room temperature as well as at elevated temperatures, with epoxy curing agent systems; forms room-temperature-curing-agent adducts with aliphatic polyamine curing agents; no apparent effect on gel rates or curing times. Suggested uses: reactive diluent for epoxy systems. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

#### EASTMAN INHIBITOR DHBP (2,4-dihydroxybenzophenone)

$C_{13}H_{10}O_3$ . MW, 214.2; MP, 142°C; BP, 194°C @ 1.0 mm; Purity, 99%; Solubility, 40% in methanol, ethanol, and MEK; and 1 in toluene and water; light yellow, crystalline solid. Chemical properties: contains the o-hydroxybenzophenone structure necessary for absorbing a very high percentage of UV radiation. Suggested uses: ultraviolet inhibitor for cellulose, unsaturated polyesters, poly (vinyl chloride) and polystyrene. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.

#### EASTMAN INHIBITOR DOBP (4-dodecyloxy-2-hydroxybenzophenone)

$C_{25}H_{34}O_3$ . MW, 383.5; Solubility, 74% in hexane; 81% in benzene and acetone; 5% in ethanol; pale yellow flakes. Suggested uses: ultraviolet stabilizer for polyethylene and polypropylene. Introduced as: new chemical product. Availability: laboratory quantities. Eastman Chemical Products, Inc., Chemicals Div.



# NEW CHEMICALS FOR INDUSTRY

## ELASTOPAR

### (N-methyl-N,4-dinitrosoaniline)

$C_7H_7N_2O_2$ ; Constituents: 33-1/3% actives on clay carrier. SpG, approx 2.05 at 25°C; light colored, free-flowing powder; Heat loss, 0.5% max; Fineness, trace max. retained on 30 mesh. Chemical properties: typical of an N-nitrosoaniline or nitrosoaromatic compound. Suggested uses: chemical modifier for elastomers, free radical source for linking unsaturated polymers. Introduced as: product with new degree of availability. Availability: commercial quantities. Monsanto Chemical Co., Organic Div.

## EMERY 963 ISODECYL PELARGONATE

$C_{19}H_{38}O_2$ ; MW, 288; Flash P, 300 F; % fire Active, 350 F 100%; Viscosity, 1.6 cs min @ 210 F, 800 cs max @ -65 F; liquid; A.N. 0.2 max; hydroxyl no. 2.0 max. Suggested uses: synthetic lubricant base fluid. Introduced as: product with new degree of availability. Availability: commercial quantities. Emery Industries, Inc., Organic Chemicals.

## EMTALL 3320

### (high viscosity distilled tall oil)

Titer, <20 C; Viscosity, 23-24 @ 25 C; 320 cs @ 140 F; Purity, 45-55% rosin acid; 8 G max; A.N., 175-190; Rosin acid no. 84-102; Unsat. 2 max. Chemical properties: low cost fatty acid; modified to eliminate crystallization at room temperature as other DTO's tend to. Suggested uses: alkyds (fatty modifier); soaps. Introduced as: significantly new grade. Availability: commercial quantities. Emery Industries, Inc., Fatty Acid Div.

## EPON RESIN 871

SpG, 0.987-0.990 g/cc @ 20 C; Flash P, 175 F (T.O.C.); Viscosity, 4-7 ps @ 25 C; Gardner scale, 12 max; liquid at ambient temperatures; Wt per epoxide, 390-470. Chemical properties: aliphatic polyepoxide that reacts with normal epoxy curing agents at elevated temperatures and with amines at room temperature. Suggested uses: with epoxy resin formulations for increasing flexibility. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Plastics & Resins Div.

## EPON RESIN 872; 872-X-75

Flash P, >200 F (T.O.C.); Viscosity, 49 ps @ 175 F; Gardner scale, 10 max, semi-solid at ambient temperatures; Wt per epoxide, 650-750; 872 is nonvolatile, 872-X-75 is 75% w nonvolatile soln. in xylene. Chemical properties: aliphatic polyepoxide that reacts with conventional epoxy curing agents, such as polyamines, polybasic acids, and Lewis acids. Suggested uses: in preparing flexible surface coatings which cure at room temperature or under baking conditions. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Plastics & Resins Div.

## EPONOL 55-B-40; 55-L-32

MW, approx 200,000; Flash P, 57 F (T.O.C.); Viscosity, 196 ps @ 25 C; Solubility, 22-40% w in methyl ethyl ketone; completely in various solvent blends; hydroxyl content, 0.35 equiv/100 g; 55-B-40 is a 40% w non-volatile soln. in methyl ethyl ketone; 55-L-32 is a 32% w nonvolatile sol. in cellosolve acetate. Chemical properties: high molecular weight linear copolymer of bisphenol A and epichlorohydrin; lacquer-type coatings produce films of outstanding toughness, adhesion, and abrasion resistance which have excellent hardness, flexibility, chemical resistance, and electrical properties. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Plastics & Resins Div.

## ETHOCEL HS 10

### (ethylcellulose)

SpG, film 1.13; Viscosity, 10 cps; white granules; Ethoxy content, 48.0-49.5. Chemical properties: improved initial color and color stability under high temperature conditions. Suggested uses: hot melt strippable coatings; hot melt adhesives; and casting compounds. Introduced as: significantly new grade. Availability: commercial quantities. The Dow Chemical Co.

## ETHYL ANTIOXIDANT 736

### [4,4'-thiobis(6-tert-o-cresol)]

$S(C_6H_4(CH_3))_2C(CH_3)_2OH$ . MW, 358.5; Density, 1.084 @ 20 C; MP, 124 C; BP, 316

@ 40 mm C; Flash P, 240 (O.C.) C; Purity, high; Solubility, 39 vol % in ethyl alcohol; 8.8 in toluene; 0.2 in isopentane, 0.002 in 10% sodium hydroxide; insoluble in water; white crystalline powder. Chemical properties: low volatility, stable temperature, relatively non-staining phenolic antioxidant. Suggested uses: antioxidant for synthetic rubber, polyolefins, petroleum oils. Introduced as: product with new degree of availability. Availability: commercial quantities. Ethyl Corp., Commercial Development Div.

## ETHYLENEDIAMINE PETRONATE

Constituents: ethylenediamine petroleum sulfonate 50.0%; mineral oil or kerosene 49.5%; water 0.5%. Suggested uses: as an ashless rust preventive for petroleum products; lends itself to the formulation of preservative oils and corrosion preventives where a zero ash content is required. Introduced as: new chemical product. Availability: semicommercial quantities. Witco Chemical Co., Inc., Organic Chemicals Div.

## ETHYL FERROCENE

### (dicyclopentadienyl iron)

$(C_5H_5)_2Fe$ . MP, 172-175 C; Purity, 98 wt%; Solubility, 19 wt% in benzene, 11 in xylene, 6 in n-hexane; insoluble in water. Suggested uses: combustion control additive; high temperature lubricant; UV stabilizer, intermediate for thermally stable and radiation resistant polymers. Introduced as: product with new degree of availability. Availability: commercial quantities. Ethyl Corp., Commercial Development Div.

## EXPERIMENTAL STABILIZER ASE-95 (acid-containing acrylic copolymer)

MW, 123.5 (solids); SpG, 1.05 @ 25 C; Flash P, none; % Active, 20; pH, approx 3.0; Viscosity, 50 cps; Water content, 80%; Solubility, in water upon neutralization; milky liquid. Suggested uses: thickener and stabilizer for liquid heavy-duty detergent; containing high levels of nonionic surfactants and alkaline builders. Introduced as: new chemical product. Availability: semicommercial quantities. Rohm & Haas Co.

## FAPREG P-3

### (stable impregnating solution based on furfuryl alcohol)

SpG, 1.142-1.146 @ 20/20 C; RI, 1.491-1.495 @ n 20/D; Viscosity, 6-8 cps; light amber liquid. Chemical properties: low viscosity and outstanding penetrating action. Suggested uses: impregnation of porous carbon and graphite articles and elimination of voids. Introduced as: new chemical product. Availability: commercial quantities. The Quaker Oats Co., Chemical Div.

## FLEXIPHEN 160

Constituents: high molecular weight alkylated phenol. MW, approx 800; MP, Durrans MP approx 25 C; % Active, 100; Solubility, in alcohols and ketones; Free phenol, 1.0% max; Chlorine, 2% max; dark viscous liquid. Chemical properties: produces internally plasticized thermosetting resins. Suggested uses: coreactant with phenols or cresols in phenolic molding resins or laminating varnishes. Introduced as: new chemical product. Availability: commercial quantities. Koppers Company, Inc., Tar Products Div.

## FLOMET-Z

### (metal lubricant)

Constituents: zinc stearate base. Water content, 1.25% max; Alkalies and alkaline earths (or sulfates), 1% max; fine, white to slightly yellow-white, bulky powder, free from grittiness. Chemical properties: Bulk, approx 16 lbs/cu ft; gives improved flow rates to metal powder-lubricant mixtures. Suggested uses: lubricant for iron powder and other metal powders used in powder metallurgy. Introduced as: significantly new grade. Availability: commercial quantities. Mallinckrodt Chemical Works, Industrial Div.

## FLUSHED PERMANSA YELLOW M FL-12-375; 10G FL-12-377; FLUSHED PERMANSA LEMON FL-12-378 (flushed hansa yellow pigments)

Constituents: FL-12-375 is 31% pigment, 38% resin solids, 31% odorless mineral spirits; FL-

12-377 is 42% pigment, 31% resin solids, 27% odorless mineral spirits; FL-12-378 is 35% pigment, 35% resin solids, 30% odorless mineral spirits. SpG, FL-12-375-1.00; FL-12-377-1.11; FL-12-378-1.02; Purity, commercial; Chemical properties: high strength, good light resistance and good heat stability. Suggested uses: in trade sales enamels where lead-free enamels are required. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## FLUSHED SOLFAST BLUE R-NC CP-1457; GREEN Y CP-1458 (flushed phthalocyanine blue and green)

Constituents: CP-1457 is 32% pigment, 68% di-iso-decyl phthalate; CP-1458 is 37% pigment, 63% di-iso-decyl phthalate. SpG, CP-1457-1.08; CP-1458-1.14; Purity, commercial; Chemical properties: flushed in diisodecyl phthalate; excellent strength, heat and light resistance; in hot weather, diisodecyl phthalate does not condense on inside of windshields. Suggested uses: in vinyl sheeting in modern cars. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## FORTICEL

### (cellulose propionate molding and extrusion thermoplastic)

Constituents: cellulose propionate plus plasticizers. Pellets, colorless or colored to order. Chemical properties: crystal clear, tough material for moldings and extrusions; available in outdoor weather-resistant formula. Suggested uses: packaging sheet, signs and displays, pipe, extruded profiles, injection-molded parts. Introduced as: significantly new grade. Availability: commercial quantities. Celanese Polymer Co.

## FOSRINSE C

Constituents: modified chromic acid. Suggested uses: stabilizing final rinse for zinc or iron phosphate coatings. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## FRUCTOSE, FOOD GRADE (D-(-) levulose)

$C_6H_{12}O_6$ ; MW, 180.16; Decomposes @ 103-105 C; Water content, <0.1%; Purity, 99+%; Solubility, freely in water; white crystalline powder; Specific rotation, -89.0 to -91.0 @ [α] 25/D; Residue after ignition, 0.05%. Chemical properties: up to 1.7 times as sweet as sucrose; up to 2.4 times as sweet as glucose. Suggested uses: oral nutrient, sweetening agent (fewer calories per unit of sweetness than sucrose or glucose—especially interesting for diabetic patients). Introduced as: significantly new grade. Availability: commercial quantities. Dawe's Laboratories, Inc., Fine Chemicals Div.

## GAFAC RM-510; RM-710 (free acid of a complex organic phosphate ester)

SpG, 1.060; 1.070; Pour P, 30 F; 60 F; % Active, essentially 100%; pH 2.0 in 10% soln.; Water content, 0.14%; 0.17%; Solubility, in aromatic solvents and kerosene, dispersible in water (RM-510); in aromatic solvents and water, partially in kerosene (RM-710); Chemical properties: anionic emulsifier; gives emulsions of outstanding spontaneity and stability. Suggested uses: emulsifier for pesticidal formulations, polyethylene, and heavy-duty industrial cleaners. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals Div.

## GANTREX AN-119; AN-139; AN-169 [poly(methyl vinyl ether/maleic anhydride)]

SpG of film, 1.37; pH, approx 2 in 5% soln.; Viscosity, AN-119: η sp — 0.1-0.5, AN-139: η sp — 1.0-1.4, AN-169: η sp — 2.6-3.5; Solubility, in water over the entire pH range and in several organic solvents, including alcohols, phenols, pyridine, aldehydes, ketones, lactams, and lower aliphatic esters. Chemical properties: wide



compatibility; reacts with alcohols, ammonia, amines, alkalis; complexes with polyhydroxy compounds, polyamines, polyvinylpyrrolidone, iodine, gelatin, and with ferric, mercuric and lead salts. Suggested uses: thickener, protective colloid, dispersing, coupling and stabilizing agent, film former, insolubilizer for certain polyfunctional compounds. Introduced as: new chemical product. Availability: semicommercial quantities. General Aniline & Film Corp., The Chemical Group, Commercial Development Dept.

#### GELTONE

White, powder. Chemical properties: organophilic gelling agent for oils. Suggested uses: compounding oil fluids for oil well drilling. Introduced as: new chemical product. Availability: commercial quantities. National Lead Co., Baroid Div.

#### GENERAL ELECTRIC SE-9007 SILICONE RUBBER COMPOUND

Constituents: polydimethylvinyl siloxane plus inert fillers and vulcanizing agent. SpG, 1.20; white solid. Chemical properties: general advantages of silicone rubber plus excellent electrical characteristics; low water absorption; very good high temperature aging. Suggested uses: wire and cable insulation to meet government and commercial specifications. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

#### GENERAL ELECTRIC SE-9008 SILICONE RUBBER COMPOUND

Constituents: polydimethylvinyl siloxane plus inert fillers and vulcanizing agent. SpG, 1.38; off-white solid. Chemical properties: general advantages of silicone rubber; good physical and electrical properties; available in coil form; No milling required prior to extrusion for 3 month period. Suggested uses: wire and cable insulation to meet government and commercial specifications. Introduced as: new chemical product. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

#### GRADE 906 FLUID OXIDATION CATALYST

Silica gel,  $K_2SO_4 \cdot V_2O_5$ . Chemical properties: resistant to sulfur in crude naphthalene. Suggested uses: oxidation of naphthalene to phthalic anhydride. Introduced as: new chemical product. Availability: commercial quantities. W. R. Grace & Co., Davison Chem Div.

#### GRAPHIC RED M CP-1464 (barium lithol red—non-resinated)

SpG, 1.62; Purity, commercial; bright medium-red powder. Chemical properties: has bright, low-zinc print tone and exceptionally good viscosity. Suggested uses: in flexographic, gravure and lithographic inks as well as all other types of inks except moisture set. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

#### HARCURE A (polysebacic anhydride)

MW, 2500; SpG, 1.0-1.05 @ 80-85 C; MP, 75-82 C; RI, 1.458  $\pm$  0.005 at 82 C; % Active, 100; Purity, 99.7; light tan solid. Suggested uses: flexibilizer and curing agent for epoxy resins. Introduced as: new chemical product. Availability: semicommercial quantities. Wallace & Tiernan Inc., Harchem Div.

#### HARCURE DIMER 870 (polymerized fatty acid)

Constituents: monomer content 15%; dimer content 44%; trimer content 41%. Viscosity 403 @ 210 F (SSU); dark viscous liquid; acid value, 160 Mg KOH/g; unsaponifiable, 3.0% max; equivalent wt, 352. Suggested uses: low cost flexibilizer for epoxy resins; chemical building block for alkyds, polyamides, polyesters and polyurethanes. Introduced as: new chemical product. Availability: commercial quantities. Wallace & Tiernan Inc., Harchem Div.

#### HARFLEX 340 (polar polymeric plasticizer)

MW, 735; SpG, 1.190  $\pm$  .002 @ 25/25 C; Flash P, 485 F; RI, 1.4612; Viscosity,  $Z_2-Z_3$  @ 25 C (Gardner-Holdt); Purity, 100%; viscous

liquid, Gardner 5+max; Suggested uses: plasticization of polar polymers such as polyvinyl acetate; has FDA approval for use in food adhesives. Introduced as: new chemical product. Availability: semicommercial quantities. Wallace & Tiernan Inc., Harchem Div.

#### HETROFOAM 250

Constituents: polyol based on HET<sup>®</sup> Acid. Suggested uses: to be combined with polyisocyanate and trichloromono-fluoromethane to yield a permanently fire retardant urethane foam. Introduced as: new chemical product. Availability: commercial quantities. Hooker Chemical Corp., Durez Div.

#### HI-SIL 422 (precipitated, hydrated silica)

SiO<sub>2</sub>, SpG, 2.08; pH, 9.4 (5% in distilled water); Water content, 6.0% (water of hydration); Solubility, insoluble in water, solvents; white powder (96+ hunter brightness); Oil absorption, 93 gms oil/100; Bulking value, 0.058 gal/lb; Index of refraction, 1.45; Particle Size (ultimate), 0.12 micron. Chemical properties: reduces prime pigment (TiO<sub>2</sub>) content in water based emulsion paints to effect savings up to 10 cents per gallon. Suggested uses: water based emulsion paints. Introduced as: new chemical product. Availability: commercial quantities. Pittsburgh Plate Glass Co., Chemical Div.

#### H.M.D.S. TREATED CHROMOSORB

Hexamethyldisilazane treated diatomaceous silica chromatographic supports. Chemical properties: deactivated gas-liquid chromatographic support. Suggested uses: in separations of amino acids and steroids by gas chromatography. Introduced as: significantly new grade. Availability: commercial quantities. Johns-Manville, Celite Div.

#### HYAMINE 3500—80% CONC (1-benzalkonium chloride)

n-alkyl (C<sub>12</sub>-40%; C<sub>14</sub>-50%; C<sub>16</sub>-10%) dimethyl benzyl ammonium chloride; Constituents: 80% ADBAC plus 20% 2-B ethanol. MW, 358 (quaternary); SpG, 0.93 @ 25 C; BP, 250 C; Flash P, 250 C (modified T.O.C.); % Active, 80; pH, 8.0 approx in 5% sol; Viscosity, V+ (Gardner-Holdt); Purity, 80%; Solubility, in water, lower alcohols, ketones; light amber liquid. Suggested uses: germicide, sanitizer, deodorant. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas Co.

#### HYBASE C-300 (oil soluble calcium sulfonate)

Constituents: sulfonate 30%; calcium 11.5%; mineral oil 43.5%. SpG, 1.1 @ 60 F; Flash P, 360 F min (C.O.C.); % Active, 30 wt% of sulfonate; Viscosity, 200 @ 210 F; Water content, 0.5 wt%; Base no, 300. Suggested uses: marine diesel cylinder lubricants when high sulfur fuels are used. Introduced as: new chemical product. Availability: semicommercial quantities. Continental Oil Co., Petrochemical Div.

#### HY-PHOS (glassy sodium hexa-m-phosphate)

Na<sub>2</sub>P<sub>6</sub>O<sub>31</sub>; Constituents: P<sub>2</sub>O<sub>5</sub>—65.5%; Na<sub>2</sub>O—34.5%; glassy sodium phosphate—99%. pH, 7.5 of 1% soln; Solubility, infinitely in water; plates and fines. Suggested uses: in detergents; boiler compounds; municipal and industrial water treatment to prevent scale formation; in oil-drilling muds; processing paper, textiles, china clay, etc. Introduced as: significantly new grade. Availability: commercial quantities. Hooker Chemical Corp., Phosphorus Div.

#### IGEPAL CA-620 (octylphenoxypoly(ethyleneoxy)-ethanol)

% Active, essentially 100%; Neutralization number, (mL KOH/g to pH 7) 0.5 max; Water content, 0.5% max; Solubility, dispersible in water; free-flowing, slightly viscous liquid; color, APHA - 200 max; Cloud point, 21-23.5 C (1% in water). Chemical properties: nonionic surfactant with detergent, emulsifying, and wetting properties. Suggested uses: low-temperature soak-tank cleaners, metal-cleaning and acid-cleaning compounds, fine-fabric detergents. Introduced as: new chemical product. Availability: commercial quantities. General Aniline & Film Corp., Antara Chemicals.

#### IMPLEX R MOLDING POWDER (modified acrylic)

SpG, 1.08; natural and colored, pellets only. Chemical properties: high impact strength; good stain resistance; low water absorption; good dimensional stability. Suggested uses: automotive armrests, control knobs, housings for business machines, portable radios & other equipment, telephones. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas Co., Plastics Div.

#### IMPREGNOLE FH

Constituents: an emulsion of waxes containing polyvalent metal salts. SpG, 1.008 @ 60 F; % Active, 25; pH, 3.8  $\pm$  0.2; Water content, 75%; Solubility, dispersible in water; white milky emulsion. Chemical properties: compatible with non-ionic and cationic materials. Suggested uses: textile water repellent for all fibers; particularly useful in conjunction with hand builders such as polyvinyl acetate and polyvinyl alcohol. Introduced as: significantly new grade. Availability: commercial quantities. Warwick Chemical Co., Sun Chemical Corp.

#### JEX

Constituents: inhibited alkaline phosphates with penetrating agent. Suggested uses: cleaning aluminum citrus juice extractors. Introduced as: new chemical product. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

#### JUVENON SOIL RETARDANT NO. 8

Constituents: mixed inorganic salts. % Active, 25; SpG, 10.3 lb/gal; pH, 6.5-7.5. Solubility, readily dilutable with water; white, homogeneous dispersion. Chemical properties: soil retardancy, soft hand, non-crystallizing. Suggested uses: soil retardant on carpets and rugs, reduces frequency of cleaning. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals Div.

#### KEMSTRENE AMIDE B (behenamide)

MW, 312, avg; MP, 100-103 C (Capillary); Water content, 0.1% moisture; Purity, 92% amide (true content); Color: (1" Lovibond) 3Y — 1.0R; % FFA, 1.8; Iodine value, 1.0. Chemical properties: excellent color and color stability. Suggested uses: waterproofing intermediate. Introduced as: new chemical product. Availability: commercial quantities. HumKo Products, Chemical Div.

#### KEMSTRENE AMIDE SU-25 (olea/stearamide)

MW, 275, avg; MP, 80-87 C (Capillary); Water content, 0.1% moisture; Purity, 94% amide (true content); Color: (1" Lovibond) 6Y — 1.7R; % FFA, 1.9; Iodine value, 56.5. Chemical properties: dry, free-flowing powder. Suggested uses: anti-block agent and slip agent for polyethylene and polypropylene films. Introduced as: new chemical product. Availability: commercial quantities. HumKo Products, Chemical Div.

#### KESSCO 3348

Constituents: new blend of mono- and diglycerides from entirely vegetable source. MP, 59.0 C; % Active, 100; Solubility, in benzol, carbon tetrachloride, ethyl acetate, heptane, isopropanol, mineral oil, methyl ethyl ketone; partly in castor oil, methanol, peanut oil; insoluble in propylene glycol, glycerol. Saponification value, 175; Acid value, 1.8; Iodine value, 0.4. Chemical properties: similar chemical composition to that of mono- and diglycerides derived from hydrogenated tallow, yet is derived from entirely vegetable source; meets rabbinical requirements. Suggested uses: FDA allowed food emulsifier; suggested where a vegetable derived product would be preferred to an animal derived product for general food use. Introduced as: significantly new grade. Availability: commercial quantities. Kessler Chemical Co., Inc., Technical Service Div.

#### KESSCOWEAVE A

MW, 350; SpG, 1.091 @ 25/15 C; Freezing P, <—50 C; RI, 1.4470 @ 25 C; % Active, 100; Solubility, in methyl ethyl ketone, benzol, carbon tetrachloride, castor oil, ethyl acetate, isopropanol, methanol; partly in water; insoluble in heptane,



# NEW CHEMICALS FOR INDUSTRY

mineral oil, peanut oil, glycerol. Straw colored liquid. Chemical properties: relatively high water solubility combined with high compatibility with resins such as polyvinyl chloride, polyvinyl acetate, cellulose acetate and acrylics. Suggested uses: water soluble bonding agent for non-woven fabrics. Water soluble lubricant. Sealing agent to organic solvents. Water soluble wax. Introduced as: new chemical product. Availability: commercial quantities. Kessler Chemical Co., Inc., Technical Service Div.

## LAG-SPRED 72-778 (resin emulsion)

Solubility, in water and benzol; white liquid. 9.5 lbs/gal; non-flammable in wet state; fire retardant in dry state. Chemical properties: excellent water and mildew resistance. Suggested uses: fast tack adhesive and washable surface coating for applying canvas, asbestos cloth, and other fabric jacketing over insulation on piping, fitting and duct work. Introduced as: new chemical product. Availability: commercial quantities. Morningstar-Paisley, Inc.

## LINER-ITE

Constituents: modified phosphate with wetting agents. Suggested uses: mild alkaline foaming manual cleaner for plastic swimming pools and pool liners. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## LITHIUM HYPOCHLORITE

LiOCl; Constituents: 30% LiOCl by wt. % Active, 35 available chlorine; pH, of soln, approx 10; Solubility, 200 ppm avail. chlorine in water @ 100 F; dissolves in 15 sec; white granules. Suggested uses: dry bleach. Introduced as: significantly new grade. Availability: laboratory quantities. Lithium Corp. America

## LTV-602 CLEAR SILICONE POTTING COMPOUND (organo-polydimethylsiloxane)

SpG, 0.995; MP, none; RI, 1.406; pH, neutral; Viscosity, 800-1500 cps; Water content, none; Purity, electrical grade; Solubility, in aromatic hydrocarbons; transparent pottling compound, which cures to resilient solid. Chemical properties: provides shock resistance & environmental protection for components embedded within it. Suggested uses: pottling and embedding compound for delicate mechanisms. Introduced as: new chemical product. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## LYRAL

### [4-(4-hydroxy-4-methyl-pentyl)-3-cyclohexene-1-carboxaldehyde]

C<sub>15</sub>H<sub>26</sub>O<sub>2</sub>; MW, 210.3; SpG, 0.980-0.993 @ 25/27 C; RI, 1.4860-1.4930 @ n<sub>D</sub> 20/D; Aldehyde content, 95%+; water white liquid. Chemical properties: remarkably soluble in various media where similar products do not have solubility; in perfumery has a floral odor; is much more diffusive and persistent than hydroxycitronellal. Suggested uses: in a wide variety of compositions. Introduced as: new chemical product. Availability: commercial quantities. International Flavors & Fragrances Inc.

## MAGNESIUM STEARATE CERTIFIED IMPALPABLE POWDER

MW, approx 294; SpG, approx bulk 8 lb/cu ft; Softening range, 150 C; Purity, acceptable for approved Food Additive use, heavy metals particularly controlled; Solubility, insoluble in water, alcohol, and ether; fine, white, bulky powder; produced from fatty acids which are certified to be obtained from edible fats and oils, free from chick edema factor. Chemical properties: especially manufactured for use where an approved Food Additive is required. Suggested uses: flow aid or lubricant in molded plastics; resin films and laminates; rubber. Introduced as: significantly new grade. Availability: commercial quantities. Mallinckrodt Chemical Works, Industrial Div.

## MAPROFIX HM (sodium lauryl sulfate)

Constituents: bicarbonate, carbonate, other salts. % Active, 65; pH, 8.0-10.5; Solubility, in water; white powder. Chemical properties: highly buffered; an inexpensive grade of pow-

dered sodium lauryl sulfate. Suggested uses: metals industry; maintenance; sanitation formulations. Introduced as: significantly new grade. Availability: commercial quantities. Onyx Chemical Corp.

## MAPROFIX LF (sodium lauryl sulfate)

% Active, 30. Chemical properties: exceptionally low free fatty alcohol and salt content. Suggested uses: polymerization reactions. Introduced as: significantly new grade. Availability: commercial quantities. Onyx Chemical Corp.

## MAPROFIX RS

% Active, 30; Water content, 70%; Solubility, miscible in water; colorless liquid. Chemical properties: dries to non-tacky white powder; produces copious suds; has controlled wetting action. Suggested uses: in rug and upholstery-cleaning formulations. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

## MAPROSYL 30 (sodium lauroyl sarcosinate)

NaC<sub>12</sub>H<sub>25</sub>O<sub>3</sub>N; % Active, 30; pH, 8.0; Solubility, in polar solvents, water; colorless liquid. Chemical properties: anticorrosive, has detergency, low toxicity. Suggested uses: rug shampoos, upholstery cleaners, metal cleaning, proprietary tooth paste & powder formulations. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

## METASOL 285 (phenyl mercuric propionate)

C<sub>6</sub>H<sub>5</sub>HgOOCCH<sub>2</sub>CH<sub>3</sub>; Constituents: 50% phenyl mercuric propionate; 50% inert. MW, 351; SpG, 1.8 lbs/gal; % Active, 50; Water content, <0.5%; Purity, 100%; free flowing whitish powder; 100 mesh. Chemical properties: wide spectrum anti-microbial; stable under wide pH and temperature ranges. Suggested uses: excellent preservative for glues, starches, joint cement, latex paint systems, pigment dispersions and paper products. Introduced as: new chemical product. Availability: commercial quantities. Metalsalts Corp., Metasol Div.

## METASOL D3T-A (3,5-dimethyltetrahydro-1,3,5,2-thiadiazine-2-thione)

C<sub>6</sub>H<sub>10</sub>N<sub>2</sub>S<sub>2</sub>; Constituents: compound in aqueous alkaline solution. SpG, 9.3 lbs/gal; Freezing P, below zero F; Flash P, none; % Active, 20; pH, >12; Non-viscous; Water content, 75%; Purity, active agent 100%; Solubility, miscible in water in all proportions; off-white liquid; slight odor. Chemical properties: decomposed by strong acids at elevated temperatures. Suggested uses: control of slime producing organisms in paper mill systems. Introduced as: new chemical product. Availability: commercial quantities. Metalsalts Corp., Metasol Div.

## METASOL QB (“8-quinolinol bound”)

Freezing P, 20 F; SpG, 1.00-1.02; BP, >250 C; Flash P, >250 F (O.C.); % Active, 36.5 8-quinoline; Water content <0.2%; Purity, 100%; Solubility, in all organic solvents, insoluble in water; amber non-viscous liquid. Chemical properties: in the presence of metals, as solvent soluble salts, reacts to form the corresponding metallo quinolinolates. Suggested uses: in situ deposition of metal quinolinolates from a single bath; stabilizer for oils and fuels—anti-fungal agent. Introduced as: new chemical product. Availability: commercial quantities. Metalsalts Corp., Metasol Div.

## METASOL NM-1 (alcyclic keto bases)

SpG, 0.95-0.97; BP, >200 C; Flash P, 95 F (T.O.C.); % Active, 100; pH, 11.2 in 1% aqueous soln; Water content, 0; Purity, 100%; Solubility, readily in organic solvents; slightly viscous, pale amber liquid; ammoniacal in odor. Chemical properties: free of metals, halogens and sulfur. Suggested uses: broad spectrum bactericide effective in pH range of 3-10 in water, water-oil or water-resin systems; particularly effective for the control of sulfate reducers. Introduced as: new chemical product. Availability: commercial quantities. Metalsalts Corp., Metasol Div.

## METHYL ANTHRANILATE EXTRA (2-amino-methyl-benzoate)

C<sub>8</sub>H<sub>9</sub>O<sub>2</sub>N; SpG, 1.116 @ 25 C; RI, 1.5830 @ 20 C; Congealing p, 24.0 C; Ester, 100%; Solubility, in 3 or more volumes of 60% alcohol; pale yellow liquid; free from the usual harsh chemical character. Suggested uses: for flavor and perfume compositions. Introduced as: significantly new grade. Availability: commercial quantities. Fritzsche Bros., Inc., Aromatic Chemicals Div.

## MIN-U-GEL 200 (attapulgit)

(OH)<sub>2</sub>4(OH)<sub>2</sub>Mg<sub>2</sub>Si<sub>2</sub>O<sub>7</sub>·4H<sub>2</sub>O. pH, 7.3-8.2; Water content, 10 to 15% moisture free; off white, fine powder; Wet screen analysis, % retained on 325 mesh — 5 avg. Chemical properties: colloidal material. Suggested uses: to thicken, gel and suspend pigments and other solids in aqueous or organic systems. Also to introduce thixotropic properties in aqueous and organic systems and to stabilize emulsions. Introduced as: significantly new grade. Availability: commercial quantities. Floridin Co.

## MIN-U-SIL (silica)

SiO<sub>2</sub>, pH, 7; Purity, 99.9% pure; white micron-sized powder; available in four grades—5, 10, 15 and 30 micron with 98% finer than size indicated. Chemical properties: closely controlled particle size distribution. Suggested uses: to increase strength of vitrified ware; low-cost inert filler, semi-reinforcing filler for silicone rubber, new source of silica for chemical processing and research. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Pennsylvania Glass Sand Corp.

## M. O. 15 RAYON OIL

Constituents: soluble oils. % Active, 100; pale yellow liquid; completely miscible with water. Standing baths for soaking skeins or cakes retain perfect suspension. Suggested uses: all purpose lubricant for warp sizing or throwing. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

## MOLYBDATE PIGMENTS (calcium, strontium and zinc molybdate)

CaMoO<sub>4</sub>; Sr Mo O<sub>4</sub>; Zn Mo O<sub>4</sub>; SpG, 3.66; 3.87; 3.74; Purity, technical grade; Solubility, 0.0013; 0.0003; 0.20; white powder. Chemical properties: nontoxic corrosion inhibiting pigments. Suggested uses: primer paints. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Mineral Pigments Corp.

## MONOETHANOLAMINE HYDRO- CHLORIDE 60%

HOCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>·HCl; Constituents: 60% w/w active stable water soln form of monoethanolamine hydrochloride soln. MW, 97.55 anhydrous; SpG, 1.1490 - 1.1590; % Active, 60; pH, 7-8; Water content, 40% max; Purity, 60% min; clear and colorless, APHA, 30 max. Suggested uses: solder salts, etc. Introduced as: product with new degree of availability. Availability: commercial quantities. Washine Chemical Corp.

## MONOSODIUM-4-CHLOROPHTHALATE CP-1424

C<sub>8</sub>H<sub>4</sub>O<sub>4</sub>ClNa; Constituents: monosodium-4-chlorophthalate (65.5%), monosodium-3-chlorophthalate, monosodium 3,4-dichlorophthalate, monosodium-4,5-dichlorophthalate, monosodium phthalated. MW, 222.57; Water content, 2.0%; Purity 65.5% min; Anhydride equivalent ratio, 69.4%; greyish white powder. Chemical properties: high proportion of active ingredients. Suggested uses: in green shade Phthalocyanine Blues. Introduced as: significantly new grade. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## MORPATLEX 65 F 657

Constituents: emulsion of thermosetting resins. % Active, 44; pH, 2.0; Viscosity, 8800 cps;



Guinea pig!





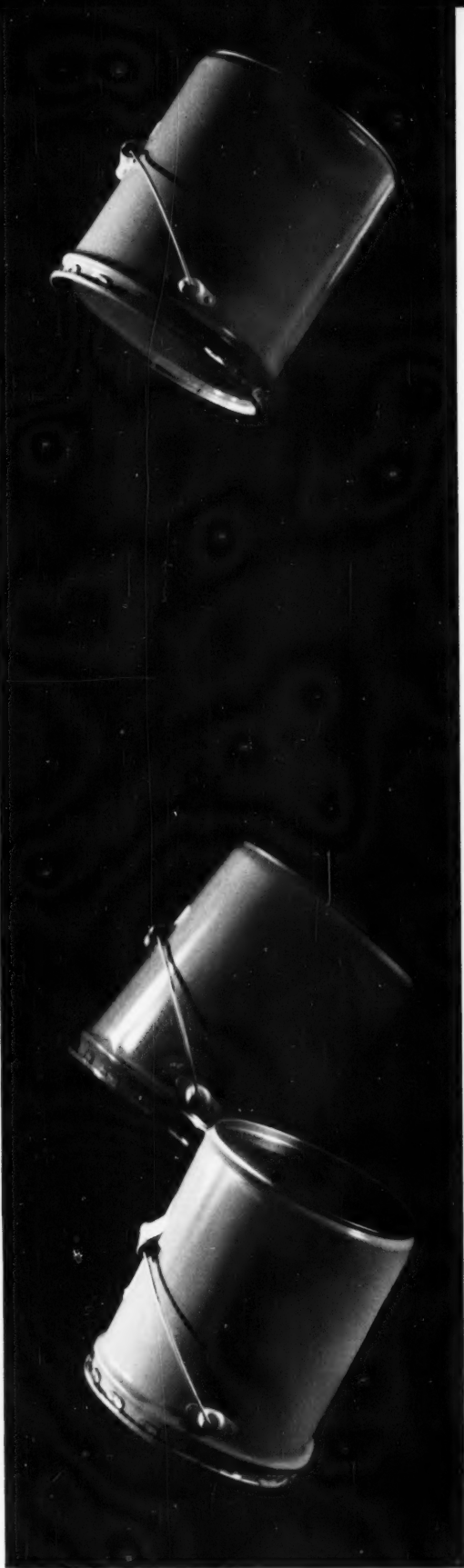
## Why we batter pails to make them better!

You can't buy these steel pails. They're guinea pigs... pulled from a regular production run. They're being put to gruesome endurance tests to find out how well they're built. The tests not only prove that our pails are made according to government specifications—they also prove that U.S. Steel pails are unsurpassed in ruggedness and quality. □ Here are the tests: We fill a pail with bicarbonate of soda, seal it, hoist it up four feet or more, then drop it on its top edge. We use a vacuum apparatus to draw the atmosphere out of a pail until it collapses. We crush pails in a compression machine. We stack filled pails and shake them on a vibrating machine which simulates shipping conditions until the bottom pail collapses. Every pail we make is checked on the production line to be positive of tightness. □ The tests abuse pails far more than the knocks of a normal lifetime. Next time you need steel pails you *know* you can count on—order them from U.S. Steel Products. Complete specifications and plant locations are available on the next page.



**Vacuum Test:** Inspector drains the air out of a steel pail in the vacuum test until the pail's sides cave in.





**Above** *Shake-Table Test*: Stacked, filled pails are bounced around unmercifully on the shake table simulating the roughest shipping conditions.

**Left** *Drop Test*: Filled with bicarbonate of soda, this steel pail is being dropped six feet onto a concrete floor.



**Note:** All pails listed below as well as our complete line of drums, have a wide variety of openings and fittings. They are also available in any color combination or specified design, and with any required lining. **Plant Locations:** Alameda, California, 1849 Oak Street, Phone: Lakehurst 2-5511 • Camden 1, New Jersey, P. O. Box 530, Phone: Normandy 3-8000 • Chicago 27, Illinois, 14700 Harvard Avenue, Phone: InterOcean 8-9610 • Los Angeles 58, California, 5100 Santa Fe Avenue, Phone: Ludlow 7-2121 • New Orleans 23, Louisiana, P. O. Box 23152, Phone: Vernon 3-2851 • Port Arthur, Texas, P. O. Box 1440, Phone: Yukon 2-9455 • Sharon, Pennsylvania, P. O. Box 251, Phone: Gibson 8-6841

Capacity Gallons	Gauge	Inside Height	Overall Height	Inside Diameter	Outside Diameter	Approx. Tare Weight	Ocean Cube	Approx. No. Per Carload	
								40'	50'

### STRAIGHT SIDE TIGHT HEAD PAILS

3	24	7-61/64	8-13/16	11-1/4	11-1/2	4.2	0/8	6890	8400
3-1/2	26	9-13/64	10-1/16	11-1/4	11-1/2	3.4	0/9	5830	7100
3-1/2	24	9-13/64	10-1/16	11-1/4	11-1/2	4.5	0/9	5830	7100
5	26	12-45/64	13-9/16	11-1/4	11-1/2	4.0	1/1	4240	5270
5	24	12-45/64	13-9/16	11-1/4	11-1/2	5.3	1/1	4240	5270
6	24	15-5/64	15-15/16	11-1/4	11-1/2	5.9	1/3	3710	4500

### LUG COVER PAILS

3	26	7-37/64	8-1/2	11-1/4	12-1/16	3.3	0/9	5350	6500
3	24	7-37/64	8-1/2	11-1/4	12-1/16	4.3	0/9	5350	6500
3-1/2	26	8-53/64	9-3/4	11-1/4	12-1/16	3.5	0/10	4280	5200
3-1/2	24	8-53/64	9-3/4	11-1/4	12-1/16	4.6	0/10	4280	5200
5	28	12-21/64	13-1/4	11-1/4	12-1/16	3.5	1/1	3200	3900
5	26	12-21/64	13-1/4	11-1/4	12-1/16	4.2	1/1	3200	3900
5	24	12-21/64	13-1/4	11-1/4	12-1/16	5.4	1/1	3200	3900
6	24	14-45/64	15-5/8	11-1/4	12-1/16	6.0	1/4	2500	3000
6-1/2	26	15-57/64	16-13/16	11-1/4	12-1/16	4.8	1/5	2500	3000
6-1/2	24	15-57/64	16-13/16	11-1/4	12-1/16	6.3	1/5	2500	3000

### DOUBLE BEAD TIGHT HEAD PAILS

3	24	7-53/64	8-11/16	11-1/4	12-1/16	4.3	0/9	4620	5600
3-1/2	24	9-5/64	9-15/16	11-1/4	12-1/16	4.5	0/10	4280	5200
5	26	12-37/64	13-7/16	11-1/4	12-1/16	4.1	1/1	3000	3650
5	24	12-37/64	13-7/16	11-1/4	12-1/16	5.4	1/1	3000	3650
6	24	14-61/64	15-13/16	11-1/4	12-1/16	6.0	1/4	2600	3160

U. S. Steel Products  
Division of  
United States Steel





# NEW CHEMICALS FOR INDUSTRY

Water content, 56%; Solubility, in water; milky thixotropic liquid, non-flammable. Chemical properties: cures at 325 F for 3 min to dry clean and launder resistant fiber. Suggested uses: adhesive for bonding fabrics to fabrics or polyurethane, producing soft hand. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

## MORPATHEX 100

Constituents: emulsion of thermosetting resins. pH, 10.0; Viscosity, 5000 cps  $\pm$  5%; white liquid. Chemical properties: cures to clear dry cleanable and launderable film; excellent mechanical stability. Suggested uses: binder for metallic pigments; adhesive for laminating fabric to fabric. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

## MULTI-PERSE GREEN GOLD 11-970; GREEN XY 11-971; VIOLET C 11-987; YELLOW L 12-960

Constituents: water pastes of color pigments. SpG, 11-970—1.02; 11-971—1.02; 11-987—1.08; 12-960—0.96. Purity, commercial. Chemical properties: stir-in pulp; have easy dispersion properties, outstanding compatibility, maximum stability, good alkali stability and light resistance. Suggested uses: in outside latex paints, including butadiene-styrene, polyvinyl acetate and acrylic. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## MYKON 463

Constituents: aqueous dispersion of fatty esters. % Active, 24  $\pm$  1%; pH, 6  $\pm$  1; Solubility, dispersible in water at 30 C or higher; white creamy liquid. Chemical properties: compatible with all common thermosetting resins and catalysts; non-yellowing, non-scorching, and no adverse effect on fluorescent brighteners or light fastness of dyes. Suggested uses: as a softener and lubricant for textiles with or without resin finishes. Introduced as: significantly new grade. Availability: commercial quantities. Warwick Chemical Div., Sun Chemical Corp.

## MYKON 515 (polyethylene emulsion, non-ionic)

% Active, 45; pH, 8.5  $\pm$  0.5; Water content, 55%; Solubility, miscible with water; light tan, opalescent liquid. Chemical properties: extremely high concentration, may be diluted by chemical formulators. Suggested uses: as lubricant and softener for textiles, especially in conjunction with thermosetting resin treatments. Introduced as: significantly new grade. Availability: commercial quantities. Warwick Chemical, Co., Sun Chemical Corp.

## MYKON Pz (emulsifiable polyethylene)

% Active, 25; pH, (undiluted) 8.9  $\pm$  0.2; Water content, 75%; translucent, light tan liquid. Chemical properties: compatible with all common thermosetting resins and catalysts, excellent storage stability and running properties. Suggested uses: as a softener and lubricant in thermosetting finishes. Introduced as: significantly new grade. Availability: commercial quantities. Warwick Chemical Co., Sun Chemical Corp.

## NAFIL SE-616 (two component polyisocyanate resin)

Chemical properties: fire retardant spray foam based on low toxicity (vapor pressure) diphenyl dimethane diisocyanate instead of commonly used toluene diisocyanate. Suggested uses: spraying of foam without the need of air masks for sprayman. Introduced as: significantly new grade. Availability: commercial quantities. Chase Chemical Corp., Resin Div.

## NATROSOL 75 (cellulose mixed ether)

SpG, 0.65 g/ml; pH, 6.5-8.5; Viscosity, 2,000 cps in water at 1% solids; Water content, 5% max; Purity, min assay 96%; Solubility, in water, MeCl<sub>2</sub>-MeOH, Toluene-MeOH, MeOH. Pyridine & others; white granular powder. Chemical properties: nonionic high mol wt

polymer soluble in wide range of organic liquids; thermal gel point at 40 C in water. Suggested uses: thickener for methylene chloride-alcohol paint removers; wherever a water-soluble polymer with good organic solvent solubility is required. Introduced as: new chemical product. Availability: commercial quantities. Hercules Powder Co., Cellulose & Protein Products.

## NFB

Constituents: phosphoric acid plus additives. pH, <1; Solubility, infinite; light blue-green liquid. Chemical properties: markedly reduces fuming of aluminum bright-dipping baths. Suggested uses: to replace phosphoric acid in aluminum bright-dipping operations. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Inorganic Div.

## NITRILE SILICONE FLUIDS, XF-1112; XF-1105; XF-1150

(CH<sub>3</sub>)<sub>2</sub>SiO(N:C CH<sub>2</sub>CH<sub>2</sub>/CH<sub>3</sub>SiO)<sub>x</sub>[(CH<sub>3</sub>)<sub>2</sub>SiO]<sub>y</sub>(CH<sub>3</sub>)<sub>3</sub>; Constituents: copolymer containing varying amounts of dimethylsiloxane and  $\beta$ -cyanoethyl methylsiloxane. SpG, 0.673-0.870 @ 25/25 C; Pour P, 110-10 F; Flash P, 490-640 F; RI, 1.4105-1.4605 @ 25 C; pH, neutral; Viscosity, 100-1,300 cs @ 25 C; Solids, 100% silicone; Purity, 100%; Solubility, polar solvents; pale yellow to water white liquid; Surface tension, 21.9-36.7 dynes/cm @ 25 C. Chemical properties: has solvent resistance polarity, electrical properties such as high dielectric constant. Suggested uses: in solvent-resistant fluids and greases, non-aqueous antifoams and electrical applications. Introduced as: new chemical product. Availability: semicommercial quantities. General Electric Co., Silicone Prods. Dept.

## NORANE CM 1 (hydrophobic thermosetting resin)

SpG, 1.0240 @ 60 F; % Active, 28.6  $\pm$  1.0%; pH, (undiluted) 9.5  $\pm$  0.2; Water content, 71.4  $\pm$  1.0%; Solubility, dispersible in water; viscous white emulsion. Chemical properties: compatible with non-ionic and anionic finishing compounds; also compatible with cationic materials with proper stabilizer; gives durable water repellency and crease resistance. Suggested uses: as a water repellent on cellulose and cellulose blend fabrics simultaneously when combined with thermosetting resins. Introduced as: new chemical product. Availability: commercial quantities. Warwick Chemical, Sun Chemical Corp.

## n-OCTYL MERCAPTAN

CH<sub>3</sub>(CH<sub>2</sub>)<sub>7</sub>CH<sub>2</sub>SH; MW, 146.29; SpG, 0.838 @ 25/15.5 C; Freezing P, -51 C; BP, 202-206 C; Flash P, 185 F (C.O.P.); RI, 1.4510 @ 25 C; Purity, 99.0%; Solubility, in acetone, benzene and methanol; water-white liquid. Suggested uses: in manufacture of herbicides, insecticides; component of resin stabilizers; chemical intermediate. Introduced as: new chemical product. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## ONOMINE 12; 14 (lauryl dimethyl amine; myristyl dimethyl amine)

Clear colorless liquid; Chemical combining wt, 230-238; 255-263. Suggested uses: antioxidants, epoxy resin hardeners, oil & grease additives, corrosion inhibitors, surfactant raw materials. Introduced as: new chemical product. Availability: commercial quantities. Onyx Chemical Corp.

## PEERAMID (starch based resin polymer)

% Active, 94 (no inert filler); Viscosity, 50 cps in 5% soln; Moisture content, 6%; Solubility, 100% in water; Mesh, 60-80; cream colored powder. Suggested uses: paper industry; stock addition to wide range of paper and paperboards. Introduced as: new chemical product. Availability: commercial quantities. Morningstar-Paisley, Inc., Paper Div.

## PENCO SPRACAL (tricalcium arsenate)

% Active, 80; Purity, 80; Solubility, insoluble;

pink, wettable powder. Chemical properties: low lime content. Suggested uses: convenient to use insecticide—boll weevil, leaf worm, boll worm on cotton. Introduced as: significantly new grade and product with new degree of availability. Availability: commercial quantities. Pennsalt Chemicals Corp., Agricultural Chemicals Div.

## PENCO ZIRAM F-3 (zinc dimethyldithiocarbamate)

% Active, 33.3; Water content, 65%; Purity, 33.3%; Solubility, insoluble in water; white ziram suspension. Chemical properties: convenient to use, no dust problem. Suggested uses: fungicide. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Agricultural Chemicals Div.

## PENNAC AM

SpG, 0.969-0.979 @ 20/20 C; Dark brown liquid. Suggested uses: dithiocarbonate type ultra accelerator for latex and dry rubber. Introduced as: new chemical product. Availability: commercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## PENNSALT CLEANER T-12

Chemical properties: mild, alkaline, non-silicated; modified phosphate with low foaming wetting agent. Suggested uses: for steel cleaning prior to thin tin plate. Introduced as: new chemical product. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## PENNSALT CLEANERS 323; A-35; AD-42; AE-17 F; AE-19; AC-89; 127-F; MC-5; AE-20; K-4; K-6; K-12

Constituents: alkaline silicates; caustic soda; inorganic acids; phosphates. Suggested uses: metal cleaners; rust removers; aluminum etchants; cleaners for railroad cars and buses. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## PENNSALT SOLVENT CLARIFIER

Constituents: modified activated carbon. Suggested uses: clarifying dry cleaning solvents. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## PENNSORB

Constituents: activated carbon with adsorbents. Suggested uses: cleaning and clarifying dry cleaning type sorbents in coin-operated dry cleaning plants. Introduced as: new chemical product. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## PENNTROWEL DAMP SURFACE PRIMER

Constituents: modified epoxy resin and hardener. Non-pigmented. Chemical properties: high bond strength to damp concrete surfaces. Suggested uses: bonding coat for monolithic toppings to damp concrete surfaces. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## PENNTROWEL EXPANSION JOINT

Constituents: filled, modified epoxy resin and hardener. Black and gray. Chemical properties: wide range of chemical resistance; resilient yet load-bearing. Suggested uses: expansion joint filler in monolithic floor toppings and brick or tile floors. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## PENNTROWEL FLEXTERM FLOOR SURFACING

Constituents: silica-filled, modified epoxy resin and hardener. Neutral gray, tile red, medium green. Chemical properties: resistant to thermal shock, corrosive environments and abrasive wear; chemically resistant to food and dairy industry cleaners, sanitizers and food products. Suggested uses: topping for concrete floors in food and dairy industry. Introduced as: significantly new grade. Availability: commercial



# NEW CHEMICALS FOR INDUSTRY

quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## PENNTROWEL LATEX FLOORING

Constituents: modified latex liquid and cement-aggregate filler. Gray color. Chemical properties: high bond strength and rugged wear characteristics in thin sections. Suggested uses: monolithic toppings of  $\frac{1}{4}$ " to  $\frac{1}{2}$ " thickness for warehouse and factory floors subject to heavy traffic. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Industrial Chemicals Div.

## PERMAFRESH 309

Constituents: formaldehyde cyclic nitrogen cellulose reactant. % Active, 40; pH, (undiluted) 6.8  $\pm$  0.15; Solubility, mixable with water; clear solution. Chemical properties: does not require catalyst; does not affect the shade or light fastness of sensitive dyes; moderate level of chlorine resistance; low odor level. Suggested uses: shrinkage stabilization of cotton knitted fabrics. Introduced as: new chemical product. Availability: commercial quantities. Warwick Chemical, Sun Chemical Corp.

## PERMAFRESH 490 (dimethylol urea)

% Active, 52; pH, (undiluted) 8.6  $\pm$  0.2; Water content, 48%; Solubility, in water @ 30 C; white, soft paste. Chemical properties: unusually low level of free formaldehyde; does not affect light fastness of sensitive dyes. Suggested uses: for crease resistance, shrinkage control, and wash-wear treatments of cellulose and cellulose blend fabrics. Introduced as: significantly new grade. Availability: commercial quantities. Warwick Chemical, Sun Chemical Corp.

## PERMA KLEER 354 CRYSTALS (sodium glucoheptonate dihydrate)

$C_{12}H_{13}O_{11}Na_2 \cdot 2H_2O$ ; Constituents: salt of polyhydroxy-acid. MW, 284; MP, >150 F; % Active, 90; pH, approx 8; Water content, 10%; Purity, traces of sugars present; Solubility, 32%. Suggested uses: highly potent iron sequestrant in medium to highly alkaline range; as adjunct in alkaline cleaners, bottle washing compounds, etc. Introduced as: significantly new grade. Availability: commercial quantities. Refined Products Co.

## PETROFOS (sodium tripolyphosphate)

$Na_5P_3O_{10}$ ; MW, 368; % Active, 100; Bulk density, 35 lbs/cu ft; Solubility, 12% solids under R. T. conditions; light white granules. Chemical properties: easy solution making; acts as cleaner as well as selective wetter. Suggested uses: additive to secondary floodwaters in the oil production industry for increasing the rate of water injection and the rate of oil recovery. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Inorganic Div.

## PETROMIX NO. 7

Constituents: an emulsifier composed predominantly of petroleum sulfonates. Chemical properties: blended with aromatic solvents and upon addition to water, highly stable, non-foaming emulsions are formed. Suggested uses: metal degreasing, engine cleaning, marine bilge cleaning, garage floor cleaning where aromatic solvent is used in the formulation of the degreasing compound. Introduced as: new chemical product. Availability: commercial quantities. Witco Chemical Co., Inc.

## PETROMIX NO. 10

Constituents: an emulsifier composed predominantly of petroleum sulfonates. Chemical properties: blended with kerosene or aliphatic hydrocarbons and upon addition to water highly stable, non-foaming emulsions are formed. Suggested uses: metal degreasing, engine cleaning, marine bilge cleaning, garage floor cleaning where a kerosene or aliphatic hydrocarbon solvent is used in the formulation of the degreasing compound. Introduced as: new chemical product. Availability: commercial quantities. Witco Chemical Co., Inc.

## PETROSENE DM

Suggested use: as direct additive for residual

fuels; minimizes slagging of fireside tubes of superheaters of marine vessels. Introduced as: new chemical product. Availability: commercial quantities. Witco Chemical Co., Inc.

## PETROSENE DZ

Suggested uses: as direct additive to fuel oil and coal high in sulfur, it prevents low temperature acid corrosion of preheater and economizer tubes in industrial, public utility and marine boiler installations. Introduced as: new chemical product. Availability: commercial quantities. Witco Chemical Co., Inc.

## PHOSPHORUS PENTOXIDE TRANSISTAR

$P_2O_5$ ; Suggested uses: source of high purity phosphorus for semiconductor doping and diffusion operations. Introduced as: significantly new grade. Availability: commercial quantities. Mallinckrodt Chemical Works, Industrial, Electronics Div.

## PICCODIENE 2215

MW, 900; SpG, 1.1; MP, 105 C; BP, none; Flash P, 230 C; RI, 1.58; % Active, 100; pH, neutral; Viscosity, Gardner Z (70% mineral spirits); Water content, 0; Solubility, in mineral spirits and aromatics; solid or flaked, Gardner 11, coal tar 2 (max); Ash, 0.1% max; Acid, Saponification No., <1. Chemical properties: heat reactivity with drying oils, water resistance, pale color. Suggested uses: in paints and varnishes, adhesives, rubber compounds, concrete curing, caulking compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Pennsylvania Industrial Chemical Corp.

## PIGMENT SCARLET CP-1396

SpG, 2.05; Purity, commercial; clean, bluish-red powder. Chemical properties: has 10-15% greater strength than conventional Pigment Scarlet; non-bleeding, non-crooking and non-migrating; has extremely good dispersion in vinyl plasticizers. Suggested uses: especially designed for use in the plastics industry. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

## PIMENTO RED (lead-molybdenum-chrome complex)

SpG, 5.5; % Active, 100; pH, neutral; Water content, .1%; Solubility, none; light red. Chemical properties: inorganic red pigment; non-bleeding; heat resistant. Suggested uses: for vinyl fabrics, low-cost industrial reds, non-bleeding red lacquers, "bronze metallica." Introduced as: new chemical product. Availability: commercial quantities. Harshaw Chemical Co., Kentucky Color & Chemical Co.

## PLASTOLEIN 9722 POLYMERIC PLASTICIZER

MW, (theoretical) 1000; SpG, 1.048 @ 25/25 C; SP, 25 F; BP, not distillable; Flash P, 510 F; Fire, 565 F; RI, 1.4686 @ 25 C; Viscosity, U-W Gardner, 411 cs @ 100 F; 34.9 cs @ 210 F; 7 max G, liquid AN, 3 max; hydroxyl value, 20 max. Suggested uses: vinyl plasticizer. Introduced as: new chemical product. Availability: commercial quantities. Emery Industries, Inc., Organic Chemicals Div.

## PLASTOLEIN 9730 POLYMERIC PLASTICIZER

MW, (theoretical) 1100; SpG, 1.064 @ 25/25 C; SP, 45 F; BP, not distillable; Flash P, 510 F; Fire, 560 F; RI, 1.4826 @ 25 C; Viscosity, 1100 cs @ 100 F; 52.4 cs @ 210 F; 7 max, Gardner AN, 3 max; hydroxyl no, 20 max. Suggested uses: vinyl plasticizer. Introduced as: new chemical product. Availability: commercial quantities. Emery Industries, Inc., Organic Chemicals Div.

## PLASTOLEIN 9750 POLYMERIC PLASTICIZER

MW, (theoretical) 2200; SpG, 1.061 @ 25/25 C; SP, 32 F; BP, not distillable; Flash P, 535 F; Fire, 600 F; RI, 1.4766 @ 25 C; Viscosity, 1180 cs @ 100 F, 79 cs @ 210 F; 7 Gardner max, AN, 3 max; hydroxyl no, 20 max. Suggested uses: vinyl plasticizer. Introduced as: new chemical product. Availability: commercial quantities. Emery Industries, Inc., Organic Chemicals Div.

## PLASTOLEIN 9765 POLYMERIC PLASTICIZER

MW (theoretical), 3500; SpG, 1.070 @ 25/25 C; SP, 35 F; BP, not distillable; Flash P, 530 F; Fire, 595 F; RI, 1.4784 @ 25 C; Viscosity, 3100 cs @ 100 F, 157 cs @ 210 F; 7 max, Gardner, AN, 3 max; hydroxyl no, 20 max. Suggested uses: vinyl plasticizer. Introduced as: new chemical product. Availability: commercial quantities. Emery Industries, Inc., Organic Chemicals Div.

## PLURACOL V-5; V-7 (polyoxyalkylene polyol)

SpG, 1.092; 1.090 @ 25/25 C; MP, liquid; BP, 220 C; Flash P, 510 F; pH, 7; Viscosity, 658.0 cps @ 100 F, 104.6 cps @ 210 F (V-5); 1420 cps @ 100 F, 5600 SUS @ 100 F, 222 cps @ 210 F (V-7); Water content, .1% max; Purity, 99%+; Solubility, in water, methanol, isopropanol, ethylene glycol, diethylene glycol, benzene, and acetone; Ash content, 0.4%; clear, yellow liquid. Chemical properties: shear and thermally stable to 480 F or more; does not promote bacterial growth. Suggested uses: thickening or bodying agent; semi-lubricant and heat transfer agent in aqueous-type mixtures. Introduced as: new chemical product. Availability: semicommercial quantities. Wyandotte Chemicals Corp., Michigan Alkali Div.

## POLECTRON 430; 450; 130 (vinylpyrrolidone/styrene copolymer; (130) vinylpyrrolidone/ethyl acrylate copolymer)

pH, approx 2; Water content, approx 60%; Solids content, 40%; fluid, milky-white emulsion; particle size, <0.5  $\mu$  (95% min). Chemical properties: anionic; exceedingly stable copolymer emulsion having unusual adhesive, dye-receptive, and film-forming properties; good freeze-thaw and shear stability; good acid and salt tolerance; compatible with starches, all resins and salts tested (including borates). Suggested uses: (430) as a detergent opacifier; (450) in glass-fiber sizes; (all) in adhesives; textile, paper, and surface coatings; nonwoven fiber binders; latex rug backings; floor wax emulsions; and aerosol starch resins. Introduced as: new chemical product. Availability: semicommercial quantities. General Aniline & Film Corp., Antara Chemicals.

## POLYCHOL 5

Constituents: molecularly distilled wool wax alcohols reacted with ETO (Number suffix indicates molecules ETO). MP, 42 C; % Active, 100; Purity, pharmaceutical; Solubility, miscible in oil; amber soft wax; practically odorless and tasteless. Suggested uses: nonionic surfactant, emulsifier, solubilizer, indelible lipstick dye solvent. Introduced as: new chemical product. Availability: commercial quantities. Croda Inc.

## POLYCHOL 10; 15; 20; 40

Constituents: molecularly distilled wool wax alcohols reacted with ETO (Number suffix indicates molecules ETO). MP, 43; 44; 45; 49 C; % Active, 100; Purity, pharmaceutical; amber wax; (10) soft; (15 and 20) semi-hard; (40) hard; practically odorless & tasteless. Suggested uses: nonionic surfactant, emulsifier, solubilizer, gel forming agent with water/alcohol/oil mixtures. Introduced as: new chemical product. Availability: commercial quantities. Croda Inc.

## POLYETHYLENE GLYCOL 300 DIACRYLATE

MW, 408; SpG, 1.130; Water content, 0.5%; Purity, 90-95%; clear, colorless, slightly viscous liquid. Introduced as: product with new degree of availability. Availability: semicommercial quantities. Refined Products Co.

## POLYPROPYLENE GLYCOL, P-1200, RESIN GRADE

MW, 1200 (avg mole wt); SpG, 1.003; % Active, 100; pH, 5.5-7.0; Water content, <0.10%; Purity, >95%; Solubility, in organic solvents; CFR, <3.0, meets urethane resin grade specifications; clear, colorless liquid. Suggested uses: for urethane coatings and elastomers; epoxy resin diluent. Introduced as: product with new degree of availability. Availability: commercial quantities. The Dow Chemical Co.



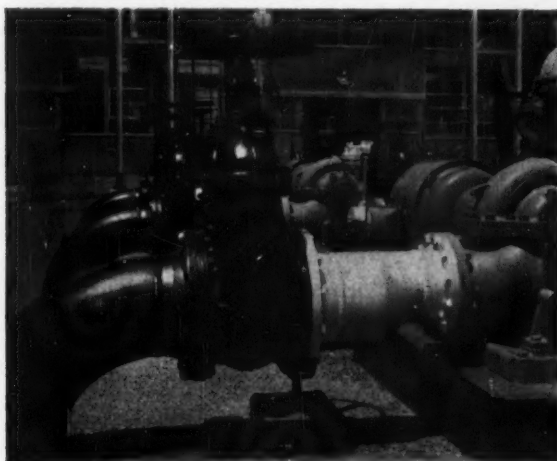
# Sell silicone paint here



**To resist weathering.** Sun, sleet, smoke, rain ruined standard coatings within months on this water tower. But a silicone-alkyd paint is still on the job after two years; is expected to last for more years to come. Silicones helped make the sale; will help sell your paint, too. And you can cook your own vehicles with Dow Corning intermediates.



**To resist heat.** Surface temperatures on these kilns and stacks reach 650 to 750 F, 24 hours a day. Ordinary paints cracked, failed quickly. But a paint based on Dow Corning silicone resins has survived; prevented corrosion, saved money. Silicones helped make the sale; will help sell your paint, too. Silicone resins for every finish are available from Dow Corning.



**To resist discoloration.** A chemical atmosphere stripped ordinary paints, left piping ripe for rust. Enter a silicone-based paint. Surfaces have stayed bright, protected for more than three years. Repainting costs are reduced. Silicones helped make the sale; will help sell your paint, too. Write Dow Corning for full information about silicone-organic copolymers.



**To resist corrosion.** Even the best organic paints blistered, peeled within days on this bronze-melting furnace, running 10 hours a day at 650 F. But a paint based on Dow Corning silicone resins has lasted *seven years with no signs of failure*. Silicones helped make the sale; will help sell your paint, too. Dow Corning will help you with formulating and technical data.

Write Dow Corning Corporation for the complete story on the sales-building benefits silicones add to paints. Address Dept. 2824, Midland, Mich.



## Dow Corning

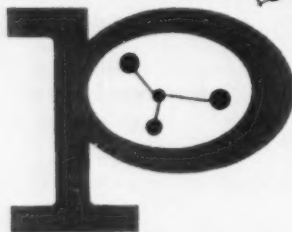


# CPF

## CHLORINATED PARAFFIN WAXES

LUBRICANT GRADE  
TEXTILE FINISHING GRADE  
PLASTICIZER GRADE

Technical information  
sheets and samples  
are available...  
drop us your request  
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**PEARSALL CHEMICAL CORPORATION**  
Phillipsburg, New Jersey  
OTHER PLANTS IN  
HOUSTON, TEXAS • SARNIA, ONTARIO

## NEW CHEMICALS FOR INDUSTRY

### POTSALD-IRIE CHEMICAL DOSIMETER FORMULATION

Constituents: wax; chloroform and dye. SpG, 0.88; MP, 61-63 C; Water content, <0.2%; yellow; turns red under x-rays. Chemical properties: molds easily, phantom models. Suggested uses: photometric x-rays penetration in radiation therapy control. Introduced as: new chemical product. Availability: commercial quantities. Fisher Scientific Co.

### PONAR BUTYL HEAT MODIFIER

Constituents: an active chlorine compound admixed with an inert extender. SpG, 2.365; MP, none; % Active, 25; pH, slightly acid; light-colored, free-flowing powder; odor similar to household bleach. Suggested uses: heat treatment promoter for butyl rubber stocks. Introduced as: new chemical product. Availability: commercial quantities. American Cyanamid Co., Organic Chemicals, Rubber Chemicals Dept.

### RESIN D-809 (polyvinyl acetate multi-polymer emulsion)

SpG, 9.04 lbs/gal; Fusion P, 175-185 F (non-flam); % Active, 46-47 solids; pH, 4.3-4.8; Emulsion viscosity, 10-30 cps @ 25 C, Brookfield, #1 spindle at 30 rpm; Polymer viscosity, 47.8 cps; Water content, 54-54%; Solubility, in 95% methanol, ethanol; in acetone; Particle size, <0.2 microns; Residual monomer, <5.5%; Particle charge, anionic; opaque white aqueous dispersion. Chemical properties: doesn't form films at room temp; forms films (continuous) on drying at 80 C or higher. Suggested uses: stiffening agent for woven and nonwoven fabrics; wet end additive for paper manufacture (increases stiffness and mullen); heat setting adhesives; surface coatings (excellent gloss, hardness, clarity, resists stains). Introduced as: new chemical product. Availability: commercial quantities. Shawinigan Resins Corp.

### RESIN D-845 (vinyl co-polymer emulsion)

MW, low; SpG, 8.74 lbs/gal; Flash P, non-flammable; % Active, 54.5 min (total solids); pH, 3-4; Emulsion viscosity, 1000-3000 cps @ 25 C, Brookfield, #2 spindle, 30 rpm; Water content, 55.5 max; Solubility, in common organic solvents; Particle size, 1-1.5 microns, some 2-4 microns; Particle charge, slight, anionic; residual monomer, <5%; opaque, white aqueous dispersion. Chemical properties: dries to highly tacky film. Suggested uses: pressure sensitive and contact adhesives; modifier for other PVAc latexes; to increase tack for lower heat temperatures. Introduced as: new chemical product. Availability: commercial quantities. Shawinigan Resins Corp.

### RESIN D-886 (vinyl acetate co-polymer, curable)

MW, medium; SpG, 9.14 lbs/gal; MP, heat seal temp.-cured film 400-410 C; Flash P, non-flammable; % Active, 49 min (total solids); pH, 4.5; Emulsion viscosity, 200 cps max @ 25 C, Brookfield, no 2 spindle, 60 rpm; Water content, 51%; Solubility, cured film, insoluble in organic solvents; opaque white aqueous dispersion. Chemical properties: cures at approx 300 F in 3 minutes. Suggested uses: binder for non-woven fabrics; textile finishing; shrinkage control for cotton and wool fabric; paper coating; leather coating. Introduced as: new chemical product. Availability: commercial quantities. Shawinigan Resins Corp.

### RETEN 205

Water content, ca 10%; Solubility, in water; white, free flowing powder. Chemical properties: synthetic, cationic polymer. Suggested uses: retention aid for paper making, flocculent for suspended fines. Introduced as: new chemical product. Availability: laboratory quantities, semicommercial quantities. Hercules Powder Co., Cellulose & Protein Prod. Dept.

### REZAD 100 (2,4-dinitroso resorcinol)

C<sub>6</sub>H<sub>3</sub>N<sub>2</sub>O<sub>4</sub> • H<sub>2</sub>O; MW, 186.13; MP, 162-163 C with decomposition; sometimes violently; % Active, 100; Solubility, very in pyridine and methanol; slightly in water, acetone, benzene, and chloroform; light brown powder; flam-

mable, requires special shipping procedures (ICC Shipping Regulations Sect. 73.153; 73.154). Suggested uses: chelating agent for metals; crosslinking agent in vulcanizing butyl rubber; adhesive for fiber-rubber bonding. Introduced as: product with new degree of availability. Availability: commercial quantities. Koppers Company, Inc., Chemicals & Dyestuffs Div.

### RHOPEX B-27

SpG, 1.05; % Active, 46 ± 0.5%; pH, 6.0 to 7.0; milky, low-viscosity dispersion. Suggested uses: pigment printing based on either oil/water or water/oil systems. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas Co., Textile Chemicals Div.

### RHOPEX HA-16

SpG, 1.06; % Active, 45 ± 0.5%; pH, 2.7 to 3.0; Solubility, readily soluble; milky, low-viscosity dispersion. Chemical properties: self-crosslinking acrylic dispersion which dries to a rigid film. Suggested uses: fabric finishing; binder for non-wovens; modifier for softer Rhopec dispersions. Introduced as: significantly new grade. Availability: commercial quantities. Rohm & Haas Co., Textile Chemicals Div.

### RHOZYME J-25 (proteolytic-diatstatic enzyme product)

Constituents: standardized with corn starch. Water content, 8% max; Purity, food grade; Solubility, in water except for diluent; light tan powder, 100% through Tyler 100 mesh; standardized at 37,000 hemoglobin units/g by the A.O.A.C. assay procedure and contains a min of 7,000 SKB/gram. Chemical properties: both high protease and high diastase activity. Suggested uses: baking bread, chillproofing beer, meat tenderizer, protein hydrolyzates, digestive aid, and wherever the solubilization of both protein and starch are desired. Introduced as: significantly new grade; availability: commercial quantities. Rohm & Haas Co., Special Products Dept.

### ROSALVA (ω-decenol)

C<sub>10</sub>H<sub>20</sub>O; MW, 156.3; SpG, 0.849-0.857 @ 15/15 C; RI, 1.4480-1.4520 @ n 20/D; Purity, hydroxyl value, 300-400; acid value, not over 5.0; water white liquid. Introduced as: product with new degree of availability. Availability: commercial quantities. International Flavors & Fragrances Inc.

### RUBANOX RED Y CP-1473 (lithol rubine)

SpG, 1.72; Purity, commercial; yellowish red powder. Chemical properties: resinated; similar to typical Lake Red C in shade; excellent brilliance and strength; good light resistance; has the good properties of regular bluish lithol rubine. Suggested uses: printing inks. Introduced as: new chemical product. Availability: commercial quantities. The Sherwin-Williams Co., Pigment, Color & Chemical Div.

### SANTICIZER 411

Constituents: a glycol-dibasic acid polymeric plasticizer. MW, 1600 ± 100; SpG, 1.103 @ 25/25 C; MP, sets to glass; Viscosity, 94 ps at 25 C; Solubility, in alcohols and ketones; miscible with monomeric and epoxy plasticizers; clear liquid; APHA 125. Suggested uses: permanent low-cost polymeric plasticizer for automotive, trunk, and furniture upholstery; high density foamed vinyl for upholstery and outerwear; oil resistant profile extrusions; baby pants. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

### SANTOWHITE 54 (modified hindered phenol)

SpG, 0.906 @ 25 C approx; Heat loss, 0.5% max; Crystallizing P, -10 C; clear, viscous, straw-colored liquid. Suggested uses: antioxidant for rubber. Introduced as: new chemical product. Availability: commercial quantities. Monsanto Chemical Co., Organic Chemicals Div.

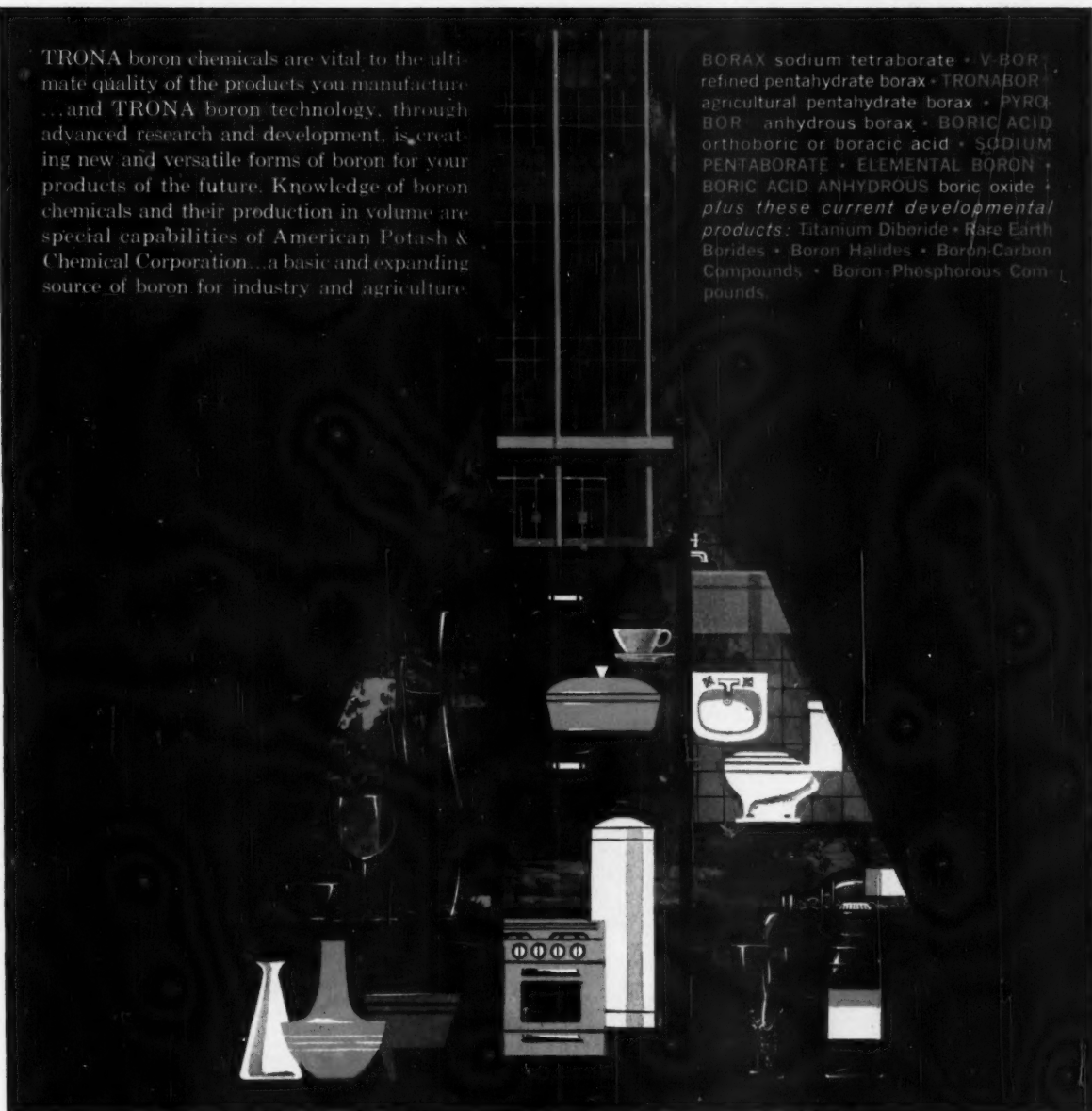


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## TRONA<sup>®</sup> BORON CHEMICALS MAKE YOUR GOOD PRODUCTS BETTER

TRONA boron chemicals are vital to the ultimate quality of the products you manufacture...and TRONA boron technology, through advanced research and development, is creating new and versatile forms of boron for your products of the future. Knowledge of boron chemicals and their production in volume are special capabilities of American Potash & Chemical Corporation...a basic and expanding source of boron for industry and agriculture.

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# Versamid®-based coatings protect Alasco Aluminum Siding Panels

General Mills worked closely with Alasco Aluminum in developing two important applications of Versamid epoxy resins in Alasco's Bak-R-Foam® aluminum siding for new homes and remodeling . . . (1) Alasco's Gold-Bak® coating for the back of aluminum siding and (2) a hot melt adhesive to bond foam insulation to the back of the aluminum panels. Each application of Versamid epoxy resins in Alasco aluminum siding presents a separate set of requirements which must be met. The back side coating must provide substantial protection against corrosion, moisture and abrasion. The Versamid-based hot melt adhesive must result in a permanent bond

and be completely inert. Alasco reports not a single failure with 175 million square feet of aluminum siding during a 5 year period.

Why not consider General Mills Versamids for your coating or bonding problem? They are available both thermosetting and thermoplastic . . . are tough yet flexible and resilient . . . adhere to almost any surface . . . offer excellent resistance to corrosion, abrasion, moisture . . . are non-toxic, easy to handle without special precautions. For all the profit-making facts, call your nearby General Mills Chemical representative, or write to us at Kankakee, Illinois.



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CREATIVE CHEMISTRY FROM GENERAL MILLS SERVES INDUSTRY WORLD WIDE

## CHEMICALS

CHEMICAL DIVISION Kankakee, Ill.; Buffalo, N.Y. and Tlalneptantla, Mex.

Versamid® Polyamide Resins, GenEpoxy® Resins, Genamid® Epoxy Curing Agent, Fatty Nitrogen Chemicals, Deriphat® Amphoteric Surfactants, Steroids





## Short Peaks Signal New Handling Ease

This simple little "taffy-test" demonstrates a valuable property of an epoxy co-reactant we recently developed . . . excellent *work-ability*! Other epoxy resin systems produce sticky hard-to-handle formulations. Chemical Tailoring through built-in functionality produces the low viscosity and outstanding wetting action of the new General Mills co-reactant XR-2000, permits epoxy systems that are highly filled with ease of handling. Unusually low toxicity also facilitates handling.

XR-2000 in an epoxy formulation provides rapid cure in a range from a tough rubbery system to a hard, glossy one . . . producing flexible, acid resistant coatings having high adhesion and impact resistance.

Investigations at our developmental lab suggest outstanding advantages of XR-2000 in: 100% solids coatings, laminating, tooling, potting and encapsulating, formulating adhesives and patching compounds. Why not write today for a research sample and descriptive data to explore the potentialities of XR-2000 in your system. Drop a line to the Chemical Division, Kankakee, Ill.



**CHEMICALS**

# NEW CHEMICALS FOR INDUSTRY

## SC-3000

Constituents: aqueous solution of mixed sodium methyl siliconates. SpG, 10.3 lb/gal; Flash P, none; % Active, 16.5-18.0 silicone solids; pH, 13; Water content, approx 70%; Solubility, in water and alcohol; colorless liquid. Chemical properties: provides water repellency. Suggested uses: in treatment of limestone, marble and concrete or other neutral-colored masonry. Introduced as: product with new degree of availability. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SE-505 SILICONE RUBBER REINFORCED GUM (methyl phenyl vinyl polysiloxane)

SpG, 1.12; off-white medium-firm solid. Suggested uses: base for making various high-strength, low temperature compounds for seals, o-rings, gaskets, ablative coatings. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SE-5401 SILICONE RUBBER COMPOUND (methyl phenyl vinyl polysiloxane)

SpG, 1.19; gray, medium soft solid. Chemical properties: usual properties of silicone rubber compounds plus extreme low temperature flexibility. Suggested uses: for seals and gaskets and general molding and extruding applications where low temperature flexibility is important; designed to meet MIL-R-5847D, Class I, 40 durometer. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SE-406 SILICONE RUBBER REINFORCED GUM (methyl vinyl polysiloxane)

SpG, 1.10; off-white, firm gum. Suggested uses: starting point for high-strength general purpose silicone rubber compounds; formulation of various durometer compounds for extrusion or molding compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SE-5504 SILICONE RUBBER COMPOUND (methyl phenyl vinyl polysiloxane)

SpG, 1.18; Purity, 100% silicone gum; gray solid. Chemical properties: usual characteristics of high strength silicone rubber compound plus self-bonding characteristics. Suggested uses: bonding to metals for use in fabricating shock mounts, rubber rolls, etc. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SELECTACEL—CM (carboxymethyl cellulose)

% Active, 100; Water content, 3-7%; Purity, reagent grade; Solubility, insoluble; Capacity (as ion-exchanger), 0.4-1.0 meq/gm; white, fibrous. Chemical properties: cellulose derivative possessing cation-exchange property. Suggested uses: chromatography of proteins and nucleic acids. Introduced as: product with new degree of availability. Availability: commercial quantities. Brown Co., Chemical Products Div.

## SELECTACEL—DEAE (diethylaminoethyl cellulose)

% Active, 100; Water content, 3-7%; Purity, reagent grade; solubility, insoluble; Capacity (as ion-exchanger), 0.6-1.2 meq/gm; white, fibrous. Chemical properties: cellulose derivative possessing anion-exchange property. Suggested uses: chromatography of proteins and nucleic acids. Introduced as: product with new degree of availability. Availability: commercial quantities. Brown Co., Chemical Products Div.

## SF-1034 (dimethyl polysiloxane and polyoxal-ylene copolymer)

Constituents: silicone-organic copolymer fluid. Flash P, 500 F (O.C.); Viscosity, 800 cs @ 25 C. Chemical properties: consistently produces uniform and fine-celled foam. Suggested uses: additive for control of cell structure in poly-

urethane foams; suggested for one-shot poly-ether flexibles and in prepolymer and one-shot rigids. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SHELL ISOPRENE LATEX (polyisoprene latex)

SpG, 0.94; pH, 10.5-11.0; Viscosity, 350 cps Brookfield (#3 Spindle @ 20 RPM); Solids content, 65-9% min; -65.0% min; white. Chemical properties: low chemical stability; good mechanical stability; rapid film forming properties; similar to natural rubber latex in many characteristics. Suggested uses: dipped and molded goods, adhesives, and foam rubber. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Synthetic Rubber Div.

## SHELL SD-3562 [3-(dimethoxyphosphinyloxy)-N,N-dimethyl cis-crotonamide]

C<sub>8</sub>H<sub>16</sub>O<sub>2</sub>NP; MW, 237.2; BP, 115-120 C @ 0.001 mm Hg; Solubility, in water, acetone and alcohol; brown liquid. Suggested uses: experimental insecticide. Introduced as: new chemical product. Availability: laboratory quantities. Shell Chemical Co., Agricultural Chemicals Div.

## SILASTIC 241U

Constituents: silicone rubber gum, vulcanizing agent, fillers, additives. SpG, 1.26; Water content, none; Solubility, resists water, weak acids and bases, common lubricating oils; white gum; Hardness, 40 durometer; Tensile, (min) 700; Elongation (min) 300. Chemical properties: serviceable at temperatures from -70 to 500 F; low durometer. Suggested uses: designed for MIL-R-5847 D, Classes IIA and IIB, Grade 40; and similar specifications. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

## SILASTIC RTV 601

Constituents: silicone rubber gum, additives; catalyst supplied separately. SpG, 1.29; Viscosity, 20,000 cs; Solubility, in most aliphatic, aromatic and chlorinated solvents; white fluid; cures to rubber. Chemical properties: vulcanizes at room-temperature, in confinement or in sections of any thickness. Suggested uses: electrical, potting and encapsulating, flexible molds. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

## SILVER-m-PHOSPHATE

AgPO<sub>3</sub>; MW, 186.86; Solubility, in nitric acid and ammonia; insoluble in water; white powder. Introduced as: new chemical product. Availability: laboratory quantities. City Chemical Corp.

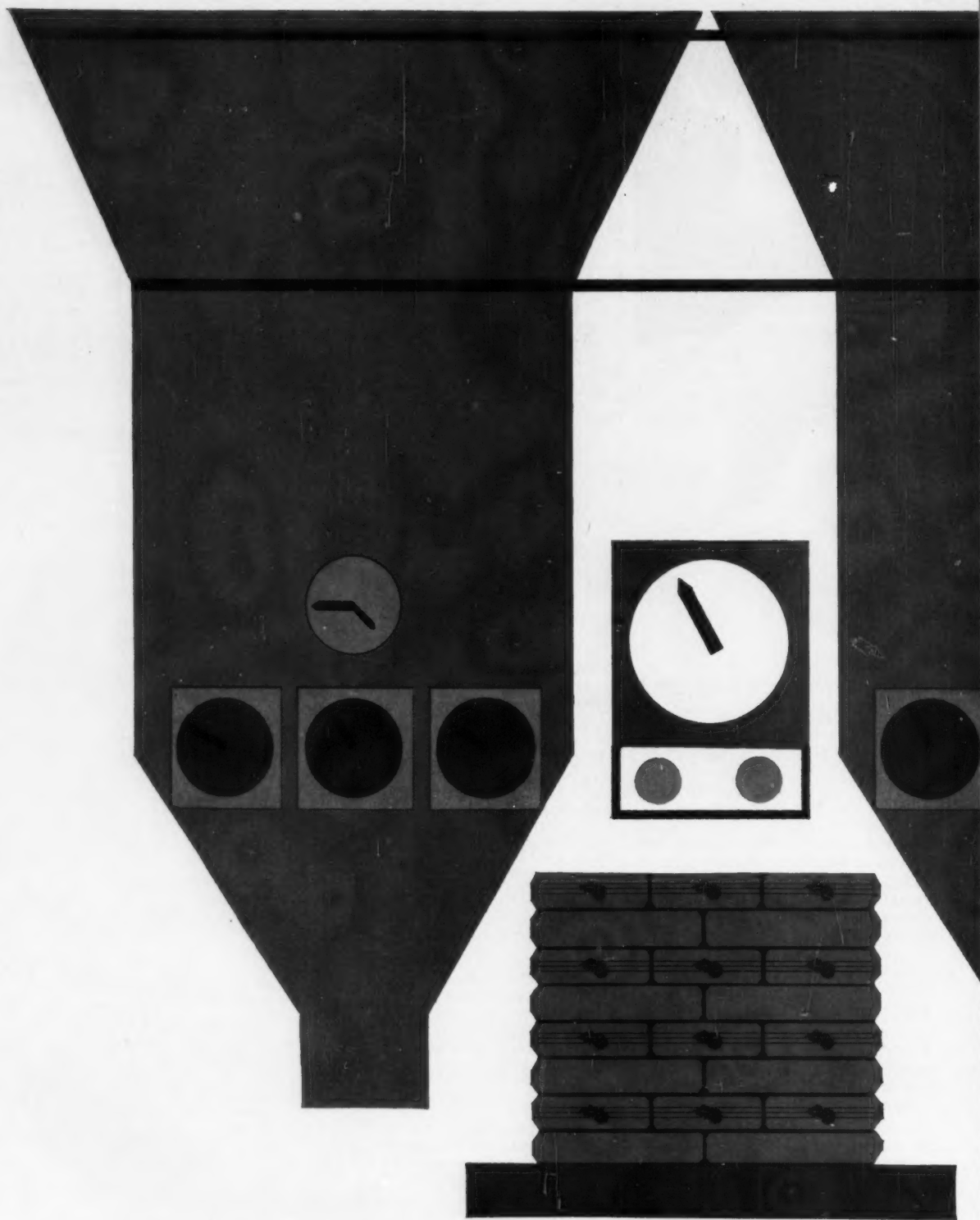
## SR-207 ETHYLENE GLYCOL DIMETHACRYLATE

C<sub>10</sub>H<sub>14</sub>O<sub>4</sub>; Constituents: contains 60 ppm hydroquinone. MW, 198; Density, 1.055; BP, 97 C @ 4 mm; Flash P, 112 C; RI, 1.4530; Viscosity, 3.5 cps; Water content, 0.3%; Purity, 98% (based on saponification); Solubility, in alcohol, ether, ketones, esters, aromatic and aliphatic hydrocarbons; clear, bright, straw-colored liquid. Chemical properties: unusually stable monomer when kept in the dark; polymerization can be accomplished by free radical catalysts, heat, light, radiation and ionic catalysts; polymerization can be promoted to cure to room temp. Suggested uses: cross-linking agent for vinyl systems; useful in polyesters, synthetic rubber, emulsions. Introduced as: significantly new grade. Availability: commercial quantities. Sartomer Resins, Inc.

## SR-205 TRIETHYLENE GLYCOL DIMETHACRYLATE

C<sub>14</sub>H<sub>22</sub>O<sub>6</sub>; Constituents: contains 60 ppm hydroquinone. MW, 286; Density, 1.071; BP, 162 C @ 1.2 mm; RI, 1.4580; Viscosity, 8 cps; Water content, 0.3%; Purity, 98% (based on saponification); Solubility, in alcohol, ether, ketones, esters, aromatic and aliphatic hydrocarbons; crystal clear, water white liquid. Chemical properties: unusually stable monomer when kept in the dark; polymerization can be accomplished by free radical catalysts, heat, light, radiation and ionic catalysts; polymeriza-





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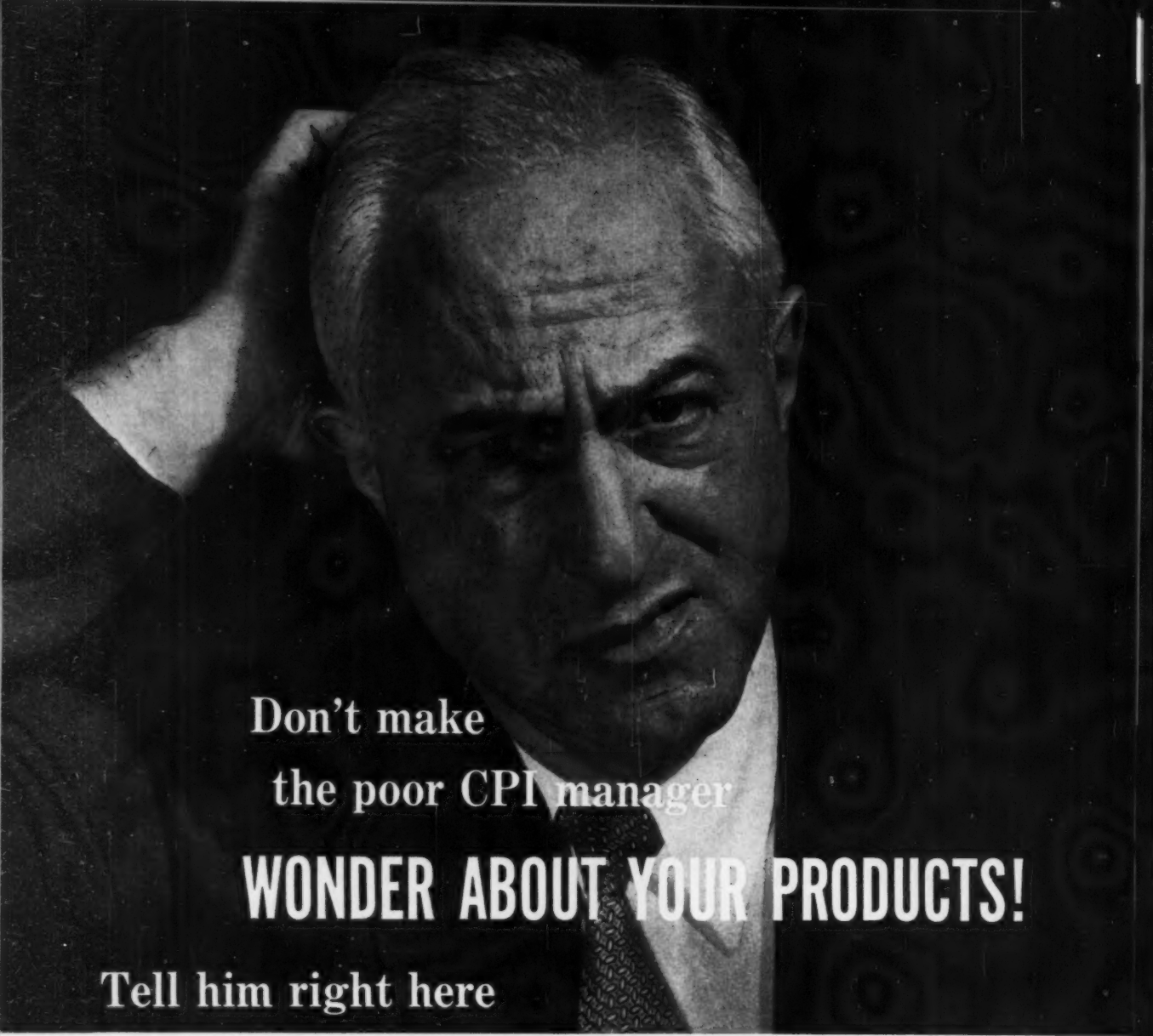
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December 16, 1961 CHEMICAL WEEK 79





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The one book that catches your prospects when they're most inquisitive to know "*who makes what*" is Chemical Week's **BUYERS' GUIDE ISSUE**. It's in their hands, when they're planning, budgeting, buying...wide open, when they're most receptive to your sales story.

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Look at it this way: No matter how much or how little you advertise next year, no matter where your salesmen call or do not call...your **GUIDE** space will be telling your story 365 days' worth in a CPI marketplace where spending averages better than \$1 billion-a-week. And don't forget, this is one medium where you won't have to fight for the buyer's attention...here he comes looking for you!

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**1962 BUYERS' GUIDE ISSUE** of Chemical Week



# NEW CHEMICALS FOR INDUSTRY

tion can be promoted to cure at room temp. Suggested uses: plastisols, dosimeters, organosols, coatings, cross-linking agents for vinyl systems. Introduced as: significantly new grade. Availability: commercial quantities. Sartomer Resins, Inc.

## SS-4023; 4025 (organo-methyl polysiloxane)

Flash P, 40 F; 80 F: % Active, 55; 60; Water content, none; Solubility, in aromatic hydrocarbons; (4023) very light straw color; (4025) water white. Suggested uses: additive for controlling release in silicone release paper coatings; pressure-sensitive tapes. Introduced as: new chemical product. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## SS-4029; 4053 (organo-methyl polysiloxane)

Flash P, 88 F; 96 F: % Active, 50; Water content, none; Solubility, in common aliphatic, aromatic and chlorinated hydrocarbons; light straw. Chemical properties: (4029) eliminates surface cure and provides uniform penetration of substrate; (4053) provides durable water repellancy and water stain surface resistance. Suggested uses: air curing water repellent for leather, paper and textiles; (4029) primarily for aerosol packaging. Introduced as: significantly new grade. Availability: commercial quantities. General Electric Co., Silicone Prods. Dept.

## STANCLERE 80 (dioctyltin carboxylate)

SpG, 1.100; RI, 1.483 @ 20 C; % Active, 100; Viscosity, 2.5 ps; Water content, nil; amber liquid. Suggested uses: heat and light stabilizer for taran lacquers and emulsions as well as PVC compounds (nontoxic), both plasticized & unplasticized. Introduced as: significantly new grade. Availability: commercial quantities. Gallard-Schlesinger Chemical Mfg. Corp.

## STARFILM 34 DD (hydroxyethyl ether of potato starch)

% Active, 100; Solubility, 100% in cold water; white flakes. Chemical properties: cross links with thermosetting resins. Suggested uses: stiff hand textile finish. Introduced as: new chemical product. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

## STARFILMS (etherified potato and tapioca starch products)

pH, 6.0-7.0; Viscosity, 80-3000 cps; Moisture content, 15%; white liquid. Chemical properties: high viscosity stability; compatible with latex; works on fast machine speeds without picking. Suggested uses: paper industry—calendar, tub, size press or size press coating, on and off machine coating. Introduced as: new chemical product. Availability: commercial quantities. Morningstar-Paisley, Inc., Paper Div.

## STARFLO (modified potato starch)

% Active, 90; pH, 6.0; Water content, 10%; Solubility, in hot water; white powder; prepare at 8-10 oz/gal. Chemical properties: high color yield. Suggested uses: low-cost thickener for Rapidogen dyestuffs. Introduced as: significantly new grade. Availability: semicommercial quantities. Morningstar-Paisley, Inc., Textile Div.

## SUNGLOW YELLOW FR, NO. 1237

Constituents: MNOA coupled with AAOA. SpG, 1.5; % Active, 100; Viscosity, dry powder; yellow pigment; 1.5 X strength of MNPT. AAOA coupling (pigment yellow 1). Chemical properties: better permanence than Hansa G (pigment yellow 1). Suggested uses: universal colorants, lead-free enamels. Introduced as: significantly new grade. Availability: commercial quantities. Harshaw Chem. Co., Kentucky Color & Chem. Div.

## SUN KEM CATALYST X-14

Constituents: organic acid complex. SpG, 1.0930 ± 0.0015 @ 60 F; pH, (undiluted) 0.5 ± 0.1;

Solubility, mixable with water; clear, water white liquid. Chemical properties: effective catalyst for cellulose reactants requiring acid catalysis; does not adversely affect the light fastness or shade of sensitive dyes or the fluorescence of optical brighteners. Introduced as: new chemical product. Availability: commercial quantities. Warwick Chemical Co., Sun Chemical Corp.

## SUPER CLORITAL

Constituents: organic chloride source in inorganic alkalies. Chemical properties: cleaner and bactericide in one product. Suggested uses: chlorinated cleaner for "cleaning in place" dairy applications. Introduced as: new chemical product. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## SUPER FINE SUPER FLOSS

Constituents: new grade of celite diatomite. SpG, 2.30; Water content, 1%; Solubility, negligible; white diatomite; particles all under 10 microns. Chemical properties: specially classified diatomite mineral filler. Suggested uses: paint flattening agent, catalyst support, polishing agent, anti-block agent. Introduced as: significantly new grade. Availability: commercial quantities. Johns-Manville, Celite Div.

## SUPER-REZ (modified polyvinyl acetate resin emulsion)

pH, 4.0-5.5; Viscosity, 5 grades; white liquid. Chemical properties: excellent mileage due to high solids, permitting adjustment to fine film without excessive penetration. Suggested uses: high speed carton sealing and forming, folding box and wrapping operations. Introduced as: new chemical product. Availability: commercial quantities. Morningstar-Paisley, Inc., Resin Div.

## SYL-GARD 182 RESIN

Constituents: solventless silicone resin. SpG, 1.05; RI, as cured 1.430; % Active, 100; Viscosity, 5,000 cs; Water content, nil; Solubility, as cured: resists water, common lubricating oils; clear flexible resin. Chemical properties: elongation in the range of 100% tensile strength, 1000 psi; good damping qualities; excellent electrical properties; transparent; serviceable from -65 to 200 C. Suggested uses: electrical potting, filling, embedding, encapsulating. Introduced as: new chemical product. Availability: commercial quantities. Dow Corning Corp.

## SYNTHOSIZE 71-3675-1 (polyvinyl acetate copolymer emulsion)

MW, low; % Active, 52; pH, 3.7; Viscosity, 4000 cps; Water content, 48%; Solubility, alkalis; white liquid. Chemical properties: tolerates very high percent of water miscible solvents. Suggested uses: textile warp size for synthetic filament fibers; additive to warp sizes for spun fibers. Introduced as: significantly new grade. Availability: semicommercial quantities. Morningstar-Paisley, Inc., Textile Div.

## TAM POTASSIUM ZIRCONIUM SULFATE

$K_2(ZrO_4)(SO_4) \cdot 4H_2O$ ; MW, 1059.47; Solubility, slightly in water and aqueous acids; insoluble in organic solvents; colorless solid. Chemical properties: reacts with alkalis to form hydrous zirconia; reacts with  $BaCl_2$  to form zirconyl chloride. Suggested uses: source of zirconium for preparing hydrous zirconia and other zirconyl compounds. Introduced as: new chemical product. Availability: laboratory quantities. National Lead Co., Titanium Alloy Mfg. Div.

## TEFLON FEP FLUOROCARBON FILM (CEMENTABLE) (fluorinated copolymer of ethylene and propylene)

MP, 285-295 C; Water content, <0.01% absorption; transparent film, gauge range 100-200. Chemical properties: nonflammable, inert, tough and with strength from -85 C to +250 C; cementable with common adhesives; low permeability to liquids, gases, moisture and organic vapors; may be heat-sealed and thermoformed.

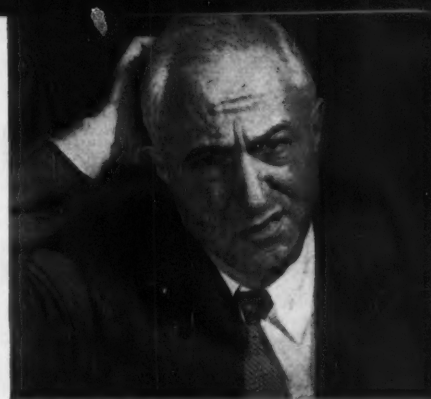
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# Chemical Week

## 1962

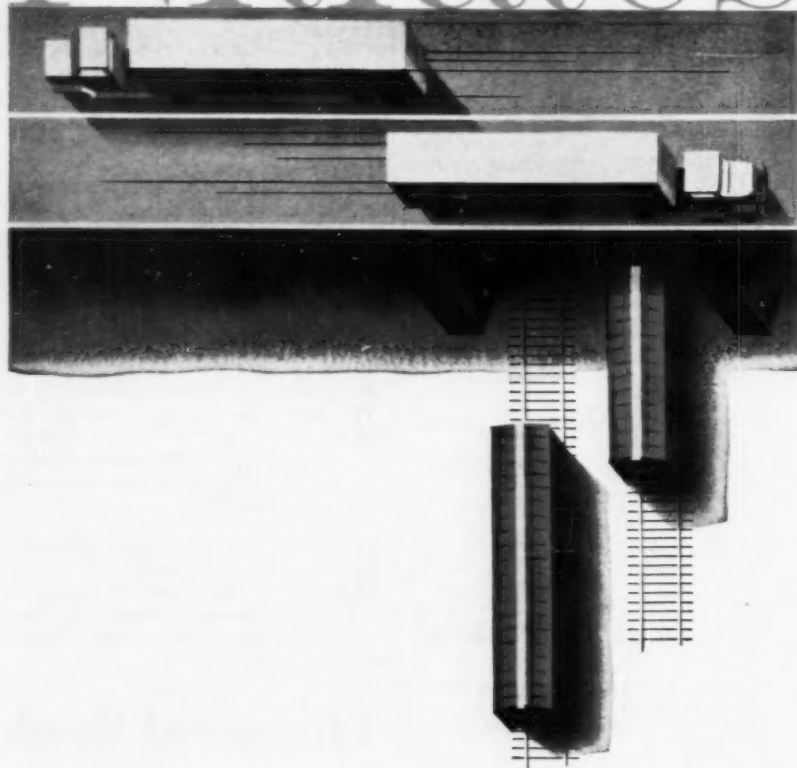
# BUYERS' GUIDE ISSUE





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# Metallic Nitrates



Aluminum	Lead
Barium	Lithium
Bismuth	*Magnesium
*Cadmium	Mercurous
*Calcium	*Nickelous
Chromium	Potassium
*Cobalt	Sodium
Cupric	Strontium
Ferric	*Zinc

These metallic nitrates produced in tonnage quantity to high standards of quality are a specialty of J. T. Baker.

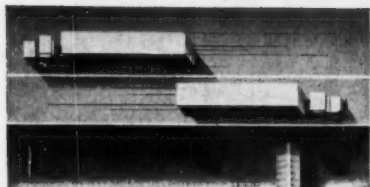
Note the high purity and definition of three of our metallic nitrates shown by their specifications. (Our standards for physical uniformity are also exacting.) You benefit through faster, more trouble-free processing. Prices are competitive . . . and we're veritable calendar-watchers when it comes to shipping your order for on-time delivery. For additional information write J. T. Baker Chemical Co., Phillipsburg, New Jersey.

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# METALLIC NITRATES

## CADMIUM NITRATE, PURIFIED FLAKE

$\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  F.W. 308.49

Assay ( $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ )	98.5 % Min.
Insoluble Matter	0.010 % Max.
Chloride (Cl)	0.005 % Max.
Sulfate ( $\text{SO}_4$ )	0.005 % Max.
Arsenic (As)	0.001 % Max.
Copper (Cu)	0.005 % Max.
Iron (Fe)	0.002 % Max.
Lead (Pb)	0.005 % Max.
Zinc (Zn)	0.050 % Max.
Solution (10%)	Clear

## NICKELOUS NITRATE, PURIFIED FLAKE

$\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$  F.W. 290.822

Assay ( $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ )	99.0 % Min.
Insoluble Matter	0.010 % Max.
pH of 5% Solution at 25° C.	3.5-5.5
Chloride (Cl)	0.004 % Max.
Sulfate ( $\text{SO}_4$ )	0.005 % Max.
Lead (Pb)	0.005 % Max.
Copper (Cu)	0.002 % Max.
Iron (Fe)	0.002 % Max.
Alkalies and Earths (as $\text{SO}_4$ )	0.20 % Max.

## COBALT NITRATE, PURIFIED FLAKE

$\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$  F.W. 291.052

Assay ( $\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ )	99.0 % Min.
Insoluble Matter	0.010 % Max.
pH of 5% Solution at 25° C.	4.0-6.0
Chloride (Cl)	0.005 % Max.
Sulfate ( $\text{SO}_4$ )	0.010 % Max.
Ammonia ( $\text{NH}_3$ )	0.20 % Max.
Copper (Cu)	0.005 % Max.
Iron (Fe)	0.002 % Max.
Nickel (Ni)	0.20 % Max.
Lead (Pb)	0.005 % Max.
Zinc (Zn)	0.150 % Max.
Substances not Precipitated by ( $\text{NH}_4$ ) <sub>2</sub> S (as $\text{SO}_4$ )	0.50 % Max.

**J. T. Baker Chemical Co.**  
Phillipsburg, New Jersey



Suggested uses: capacitors, printed cable and circuits, electrical insulation, seals and diaphragms, bearings, mold release, protective clothing; first cementable version of "Teflon" films. Introduced as: significantly new grade. Availability: commercial quantities. E. I. du Pont de Nemours Film Dept.

## TELODRIN INSECTICIDE

(1,3,4,5,6,7,8,8-octachloro-1,3,3a,4,7,7a-hexahydro-4,7-methanoisobenzofuran)

$\text{C}_{12}\text{H}_4\text{Cl}_8\text{O}$ ; MW, 411.7; SpG, 1.9 @ 60/60 F; MP, 120-125 C; Purity, technical grade contains not less than 95% Telodrin; Solubility, in acetone, benzene, toluene, ethyl ether, xylene, and heavy aromatic naphtha; off-white crystalline solid. Chemical properties: non-flammable, stable in storage. Suggested uses: insecticide. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Agricultural Chemicals Div.

## TENTH-SECOND BUTYRATE (cellulose acetate butyrate)

Constituents: mixed ester of cellulose. MW, 15,000; SpG, 1.20 @ 20/20 C; MP, 160 C; RI, 1.48 @ 25/D; white powder. Chemical properties: low solution viscosity; wide solubility and compatibility; low color; excellent ultraviolet light stability. Suggested uses: film-former for protective coatings. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Chemicals Div.

## TERGITOL NP-33

Nonyl phenol adduct with 13 mols of ethylene oxide; SpG, 1.0575 @ 20/20 C; Freezing P, 18 C; Flash P, 565 F; pH, 5.0-8.0 @ 25 C; Viscosity, 125 cps @ 100 F; 15 cps @ 212 F; Water content, 0.3 wt%; Purity, 100%; Solubility, slight haze in water @ 20 C; Pt-Co, 100 max; suspended matter, substantially free; Cloud P, (0.5% aq soln), 86-92 C; Surface tension (0.10% aq soln), 35 dynes/cm @ 25 C. Chemical properties: nonionic surfactant; polyglycol ether, stable in acids, bases, and salts. Suggested uses: in latexes; in high-sudsing liquid detergents where high cloud point product effective at elevated temperatures is needed. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

## THPC

[tetraakis(hydroxymethyl)phosphonium chloride]

( $\text{HOCH}_2$ )<sub>4</sub>PCl; Constituents: 80% aq soln. MW, 190.44; SpG, 1.332 @ 25/15.5 C; Last Crystal P, -14 C; pH, 0.4; Purity, 81%; white to pale yellow soln. Suggested uses: in processes for durable fire-retardant finishes on cotton and rayon textiles, paper and other cellulosic materials. Introduced as: significantly new grade. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## TILITE

Chemical properties: mild acid, abrasive. Suggested uses: cleaner for stain and scale removal from tile, especially swimming pools. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## UCAR AMYLPHENOL 4T

$\text{C}_5\text{H}_{11}\text{C}_6\text{H}_4\text{OH}$ ; MW, 164.24; Freezing P, 93 C; BP, 262.5 @ 760 mm Hg; Solubility, wt % in water, 20 C, insoluble; wt % water in, 20 C, insoluble. Suggested uses: solvent for inks and coatings. Introduced as: new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

## UCAR PAPER COATING BINDER 40 (acrylic copolymer latex)

SpG, 1.02 @ 20/20 C; pH, 7.0-7.5; Solids content, 46%. Chemical properties: excellent mechanical stability; stable to calcium chloride. Suggested uses: for paper and paper-board coatings. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

# NEW CHEMICALS FOR INDUSTRY

## UCAR PIGMENT BINDER 180 (vinyl acetate-acrylate copolymer)

SpG, 1.08 @ 20/20 C (apparent); pH, 4.0-5.0; Viscosity, 200-600 cps @ 20 C; Solids content, 54-56%. Chemical properties: high pigment binding capacity, fine particle size, high borax stability, zinc oxide compatibility. Suggested uses: for interior flat paints, masonry paints, exterior house paints, factory-finished building products, primer sealers, mastics, and caulking compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR RESIN WC-130 (polyvinyl acetate homopolymer)

SpG, 1.10 20/20 C (apparent); pH, 4.0-5.0; Viscosity, 1500-2500 cps @ 20 C; Solids content, 57-59%. Chemical properties: outstanding borax stability; high pigment binding capacity; outstanding mechanical and freeze-thaw stability; low foaming. Suggested uses: for interior flat paints, masonry paints, factory-finished building products, primer sealers, mastics, and caulking compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR SOLVENT LM; 2 LM

$\text{CH}_3\text{OC}_3\text{H}_7\text{O}_2\text{H}$ ;  $\text{CH}_3\text{O}(\text{C}_3\text{H}_7\text{O})_2\text{H}$ ; MW, 90.12; 148.20; SpG, 0.9228; 0.9608 @ 20/20 C; Freezing P, -30 C (sets to glass below this); BP, 120.5; 187.2 C @ 760 mm Hg; Flash P, 97 F; 169 F; RI, 1.4013; 1.4205; Viscosity, (2LM) 5.2 cps @ 20 C; Water content, 0.10 wt%; Solubility, wt % in water, 20 C: infinite; wt % in water in, 20 C: infinite; Pt-Co, 10. Distillation, IBP 119 C; DP, 129 C; Suspended matter, substantially free; Vapor pressure, 6.7; 0.06 @ 20 C; Suggested uses: solvent for cellulose esters, lacquers, varnishes, enamels, dyestuffs, wood stains; mutual solvent for soluble oils, insecticides, dry-cleaning soaps; hydraulic fluid component; plasticizer intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR VISCOSITY INDEX IMPROVER FH-40

SpG, 0.910 @ 20/20 C; Flash P, 200 F min; Viscosity, 1900 sus at 210 F; 470 cs @ 210 F; Ash, nil; Suspended matter, nil; Gardner. Suggested uses: for improving viscosity index of MIL-H 5606 A hydraulic fluids, commercial hydraulic fluids, trans-axle fluids, and central hydraulic fluids. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

## ULTRAVIOLET ABSORBER UV 284 PHARMACEUTICAL GRADE (2-hydroxy-4-methoxy-S-sulfobenzophenone trihydrate)

$\text{C}_{14}\text{H}_{11}\text{O}_6\text{S}$ ; MW, 361.34; MP, 109-110 C; Purity, 99.5%; Solubility, 25% in water; very in alcohol; light yellow solid. Chemical properties: aqueous solutions absorb ultraviolet light. Suggested uses: pharmaceutical sun screens; dye protectant in cosmetics and pharmaceuticals. Introduced as: new chemical product. Availability: laboratory quantities. American Cyanamid Co., Fine Chemicals Div.

## ULTRAVIOLET ABSORBER UV-24 PHARMACEUTICAL GRADE (2,2'-dihydroxy-4-methoxybenzophenone)

$\text{C}_{14}\text{H}_{12}\text{O}_4$ ; MW, 244.24; MP, -68.70 C; BP, 160-170 C; Purity, 99%; Solubility, in benzene, butylacetate and ethylalcohol; pale yellow powder. Chemical properties: absorbs ultraviolet light throughout the 300 to 400 mμm range. Suggested uses: Sun Screen preparations; protectant for color in pharmaceutical and cosmetic preparations. Introduced as: new chemical product. Availability: laboratory quantities. American Cyanamid Co., Fine Chemicals Div.

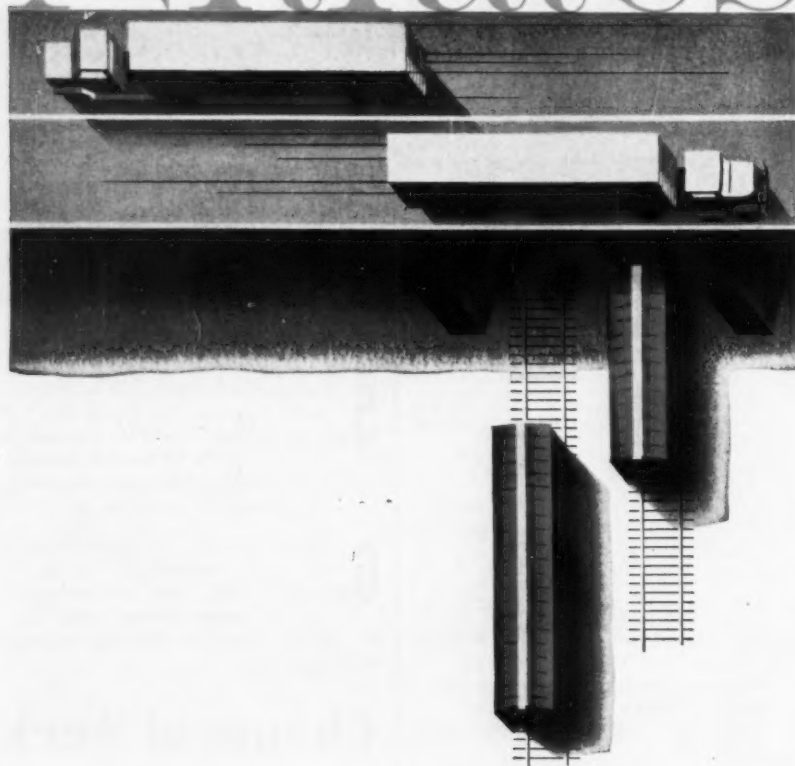
## VERTENEX HC (p-tert-butyl cyclohexyl acetate)

$\text{C}_{12}\text{H}_{22}\text{O}_2$ ; Constituents: 68-72% cis isomer; 28-32% trans isomer. MW, 198.3; SpG, 0.940-0.944 @ 15/15 C; RI, 1.4510-1.4530 @ n 20/D; Ester no, 278-284; Acid no, not over 1; water white liquid. Chemical properties: in perfumery has a strong, rich, wood odor. Suggested uses: useful in blends with



Immediate shipment  
High purity and definition  
Volume production

# Metallic Nitrates



Aluminum	Lead
Barium	Lithium
Bismuth	*Magnesium
*Cadmium	Mercurous
*Calcium	*Nickelous
Chromium	Potassium
*Cobalt	Sodium
Cupric	Strontium
Ferric	*Zinc

These metallic nitrates produced in tonnage quantity to high standards of quality are a specialty of J. T. Baker.

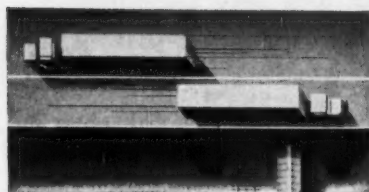
Note the high purity and definition of three of our metallic nitrates shown by their specifications. (Our standards for physical uniformity are also exacting.) You benefit through faster, more trouble-free processing. Prices are competitive . . . and we're veritable calendar-watchers when it comes to shipping your order for on-time delivery. For additional information write J. T. Baker Chemical Co., Phillipsburg, New Jersey.

\*Now available in easy-to-use, thin, flat flake form.



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# METALLIC NITRATES

## CADMIUM NITRATE, PURIFIED FLAKE

$\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  F.W. 308.49

Assay ( $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ )	98.5 % Min.
Insoluble Matter	0.010 % Max.
Chloride (Cl)	0.005 % Max.
Sulfate ( $\text{SO}_4$ )	0.005 % Max.
Arsenic (As)	0.001 % Max.
Copper (Cu)	0.005 % Max.
Iron (Fe)	0.002 % Max.
Lead (Pb)	0.005 % Max.
Zinc (Zn)	0.050 % Max.
Solution (10%)	Clear

## NICKELOUS NITRATE, PURIFIED FLAKE

$\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$  F.W. 290.822

Assay ( $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ )	99.0 % Min.
Insoluble Matter	0.010 % Max.
pH of 5% Solution at 25° C.	3.5-5.5
Chloride (Cl)	0.004 % Max.
Sulfate ( $\text{SO}_4$ )	0.005 % Max.
Lead (Pb)	0.005 % Max.
Copper (Cu)	0.002 % Max.
Iron (Fe)	0.002 % Max.
Alkalies and Earths (as $\text{SO}_4$ )	0.20 % Max.

## COBALT NITRATE, PURIFIED FLAKE

$\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$  F.W. 291.052

Assay ( $\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ )	99.0 % Min.
Insoluble Matter	0.010 % Max.
pH of 5% Solution at 25° C.	4.0-6.0
Chloride (Cl)	0.005 % Max.
Sulfate ( $\text{SO}_4$ )	0.010 % Max.
Ammonia ( $\text{NH}_3$ )	0.20 % Max.
Copper (Cu)	0.005 % Max.
Iron (Fe)	0.002 % Max.
Nickel (Ni)	0.20 % Max.
Lead (Pb)	0.005 % Max.
Zinc (Zn)	0.150 % Max.
Substances not Precipitated by ( $\text{NH}_4$ ) <sub>2</sub> S (as $\text{SO}_4$ )	0.50 % Max.

**J. T. Baker Chemical Co.**  
Phillipsburg, New Jersey



# NEW CHEMICALS FOR INDUSTRY

Suggested uses: capacitors, printed cable and circuits, electrical insulation, seals and diaphragms, bearings, mold release, protective clothing; first cementable version of "Teflon" films. Introduced as: significantly new grade. Availability: commercial quantities. E. I. du Pont de Nemours Film Dept.

## TELODRIN INSECTICIDE (1,3,4,5,6,7,8,8-octachloro-1,3,3a,4,7,7a-hexahydro-4,7-methanoisobenzofuran)

$\text{C}_{10}\text{H}_4\text{Cl}_8\text{O}$ ; MW, 411.7; SpG, 1.9 @ 60/60 F; MP, 120-125 C; Purity, technical grade contains not less than 95% Telodrin; Solubility, in acetone, benzene, toluene, ethyl ether, xylene, and heavy aromatic naphtha; off-white crystalline solid. Chemical properties: non-flammable, stable in storage. Suggested uses: insecticide. Introduced as: new chemical product. Availability: commercial quantities. Shell Chemical Co., Agricultural Chemicals Div.

## TENTH-SECOND BUTYRATE (cellulose acetate butyrate)

Constituents: mixed ester of cellulose. MW, 15,000; SpG, 1.20 @ 20/20 C; MP, 160 C; RI, 1.48 @ 25/D; white powder. Chemical properties: low solution viscosity; wide solubility and compatibility; low color; excellent ultraviolet light stability. Suggested uses: film-former for protective coatings. Introduced as: new chemical product. Availability: commercial quantities. Eastman Chemical Products, Chemicals Div.

## TERGITOL NP-33

Nonyl phenol adduct with 13 mols of ethylene oxide; SpG, 1.0575 @ 20/20 C; Freezing P, 18 C; Flash P, 565 F; pH, 5.0-8.0 @ 25 C; Viscosity, 125 cps @ 100 F; 15 cps @ 212 F; Water content, 0.3 wt%; Purity, 100%; Solubility, slight haze in water @ 20 C; Pt-Co, 100 max; suspended matter, substantially free; Cloud P, (0.5% aq soln), 86-92 C; Surface tension (0.10% aq soln), 35 dynes/cm @ 25 C. Chemical properties: nonionic surfactant; polyglycol ether, stable in acids, bases, and salts. Suggested uses: in latexes; in high-sudsing liquid detergents where high cloud point product effective at elevated temperatures is needed. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

## THPC

[tetraakis(hydroxymethyl)phosphonium chloride]

( $\text{HOCH}_2$ )<sub>4</sub>PCl; Constituents: 80% aq soln. MW, 190.44; SpG, 1.332 @ 25/15.5 C; Last Crystal P, -14 C; pH, 0.4; Purity, 81%; white to pale yellow soln. Suggested uses: in processes for durable fire-retardant finishes on cotton and rayon textiles, paper and other cellulosic materials. Introduced as: significantly new grade. Availability: semicommercial quantities. Hooker Chemical Corp., Eastern Chemical Div.

## TILITE

Chemical properties: mild acid, abrasive. Suggested uses: cleaner for stain and scale removal from tile, especially swimming pools. Introduced as: significantly new grade. Availability: commercial quantities. Pennsalt Chemicals Corp., Chemical Specialties Div.

## UCAR AMYLPHENOL 4T

$\text{C}_5\text{H}_{11}\text{C}_6\text{H}_4\text{OH}$ ; MW, 164.24; Freezing P, 93 C; BP, 262.5 @ 760 mm Hg; Solubility, wt % in water, 20 C, insoluble; wt % water in, 20 C, insoluble. Suggested uses: solvent for inks and coatings. Introduced as: new chemical product. Availability: semicommercial quantities. Union Carbide Chemicals Co.

## UCAR PAPER COATING BINDER 40 (acrylic copolymer latex)

SpG, 1.02 @ 20/20 C; pH, 7.0-7.5; Solids content, 46%. Chemical properties: excellent mechanical stability; stable to calcium chloride. Suggested uses: for paper and paper-board coatings. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR PIGMENT BINDER 180 (vinyl acetate-acrylate copolymer)

SpG, 1.08 @ 20/20 C (apparent); pH, 4.0-5.0; Viscosity, 200-600 cps @ 20 C; Solids content, 54-56%. Chemical properties: high pigment binding capacity, fine particle size, high borax stability, zinc oxide compatibility. Suggested uses: for interior flat paints, masonry paints, exterior house paints, factory-finished building products, primer sealers, mastics, and caulking compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR RESIN WC-130 (polyvinyl acetate homopolymer)

SpG, 1.10 @ 20/20 C (apparent); pH, 4.0-5.0; Viscosity, 1500-2500 cps @ 20 C; Solids content, 57-59%. Chemical properties: outstanding borax stability; high pigment binding capacity; outstanding mechanical and freeze-thaw stability; low foaming. Suggested uses: for interior flat paints, masonry paints, factory-finished building products, primer sealers, mastics, and caulking compounds. Introduced as: product with new degree of availability. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR SOLVENT LM; 2 LM

$\text{CH}_3\text{OC}_2\text{H}_4\text{OH}$ ;  $\text{CH}_3\text{O}(\text{C}_2\text{H}_4\text{O})_2\text{H}$ ; MW, 90.12; 148.20; SpG, 0.9223; 0.9608 @ 20/20 C; Freezing P, -80 C (sets to glass below this); BP, 120.5; 187.2 C @ 760 mm Hg; Flash P, 97 F; 169 F; RI, 1.4013; 1.4205; Viscosity, (2LM) 5.2 cps @ 20 C; Water content, 0.10 wt%; Solubility, wt % in water, 20 C: infinite; wt % in water in, 20 C: infinite; Pt-Co, 10. Distillation, IBP 119 C; DP, 129 C; Suspended matter, substantially free; Vapor pressure, 6.7; 0.06 @ 20 C. Suggested uses: solvent for cellulose esters, lacquers, varnishes, enamels, dyestuffs, wood stains; mutual solvent for soluble oils, insecticides, dry-cleaning soaps; hydraulic fluid component; plasticizer intermediate. Introduced as: product with new degree of availability. Availability: commercial quantities. Union Carbide Chemicals Co.

## UCAR VISCOSITY INDEX IMPROVER FH-40

SpG, 0.910 @ 20/20 C; Flash P, 200 F min; Viscosity, 1900 sus at 210 F; 470 cs @ 210 F; Ash, nil; Suspended matter, nil; S Gardner. Suggested uses: for improving viscosity index of MIL-H 5606 A hydraulic fluids, commercial hydraulic fluids, trans-axle fluids, and central hydraulic fluids. Introduced as: new chemical product. Availability: commercial quantities. Union Carbide Chemicals Co.

## ULTRAVIOLET ABSORBER UV 284 PHARMACEUTICAL GRADE (2-hydroxy-4-methoxy-S-sulfobenzophenone trihydrate)

$\text{C}_{14}\text{H}_{11}\text{O}_6\text{S}$ ; MW, 361.34; MP, 109-110 C; Purity, 99.5%; Solubility, 25% in water; very in alcohol; light yellow solid. Chemical properties: aqueous solutions absorb ultraviolet light. Suggested uses: pharmaceutical sun screens; dye protectant in cosmetics and pharmaceuticals. Introduced as: new chemical product. Availability: laboratory quantities. American Cyanamid Co., Fine Chemicals Div.

## ULTRAVIOLET ABSORBER UV-24 PHARMACEUTICAL GRADE (2,2'-dihydroxy-4-methoxybenzophenone)

$\text{C}_{14}\text{H}_{12}\text{O}_4$ ; MW, 244.24; MP, -68.70 C; BP, 160-170 C; Purity, 99%; Solubility, in benzene, butylacetate and ethylalcohol; pale yellow powder. Chemical properties: absorbs ultraviolet light throughout the 300 to 400 millimicron range. Suggested uses: Sun Screen preparations; protectant for color in pharmaceutical and cosmetic preparations. Introduced as: new chemical product. Availability: laboratory quantities. American Cyanamid Co., Fine Chemicals Div.

## VERTENEX HC (p-tert-butyl cyclohexyl acetate)

$\text{C}_{12}\text{H}_{22}\text{O}_2$ ; Constituents: 68-72% cis isomer; 28-32% trans isomer. MW, 198.3; SpG, 0.940-0.944 @ 15/15 C; RI, 1.4510-1.4530 @ n 20/D; Ester no, 278-284; Acid no, not over 1; water white liquid. Chemical properties: in perfumery has a strong, rich, wood odor. Suggested uses: useful in blends with



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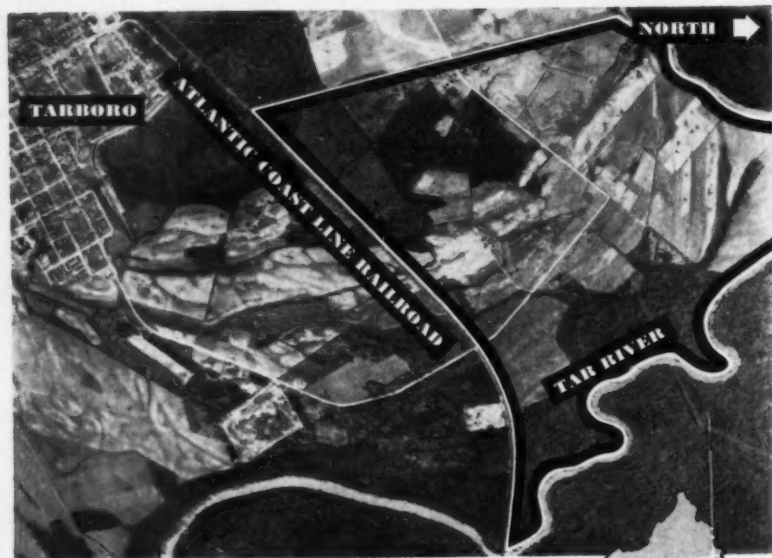
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## NEW CHEMICALS FOR INDUSTRY

ionones. Introduced as: product with new degree of availability. Availability: commercial quantities. International Flavors & Fragrances Inc.

### VINYMUL 43-663 (polyvinyl acetate emulsion)

MW, low to med; SpG, 1.04 avg; pH, 4.5-4.0; consistency, 1200 cps; Water content, 45%; white liquid. Mechanical stability; excellent particle charge; nonionic; superior non-sticking properties on hot drying cans. Suggested uses: textile finish—stiff hand. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

### VINYMUL 71-4048 (polyvinyl acetate—acrylate terpolymer latex)

MW, low to med; SpG, 1.04 avg; pH, 4.5-4.0; Viscosity, 8-10 cps @ 25°C; Water content, 60 wt%; latex, milky white color; clear, flexible, glossy film. Suggested uses: binder for pigments, ceramic fibers, etc. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Resin Div.

### VINYMUL 71-4064 (polyvinyl acetate copolymer emulsion)

MW, high; % Active, 48; pH, 4.5-5.5; Viscosity, 900-1000 cps; Water content, 52%; white liquid, tacky, clear. Chemical properties: very highly plasticized internally; excellent adhesion to difficult surfaces; very soft hand. Suggested uses: adhesive; textile finishing; pigment binding. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

### VINYMUL 71-4070; EK 3971 (polyvinyl acetate copolymer emulsion)

% Active, 52; pH, 4.5-5.5; Viscosity, 1000 cps; Water content, 48%; white liquid, clear, flexible. Chemical properties: soft full hand. Suggested uses: textile finishing; non-woven fabric binder. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

### VINYMUL 71 EK 3971 (polyvinyl acetate copolymer emulsion)

% Active, 55; pH, 4.0-5.0; Viscosity, 500-1000 cps; Water content, 45%; white liquid; particle size, 0.5 micron avg; particle charge, anionic. Chemical properties: borate stable; soft lustrous hand. Suggested uses: textile finishing; non-woven fabric binder. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Textile Div.

### VINYMUL 75-4217 (polyvinyl acetate resin emulsion)

MW, high; SpG, 1.12; pH, 4.5-5.5; Viscosity, 750-1000 cps @ 25°C; Water content, 45 wt%; % Active, 55; Solubility, resin is 100% soluble in benzene, MEK, toluene, T.H.F.; milky white liquid, does not contain polyvinyl alcohol or cellulose derivatives. Chemical properties: tolerates multi-valent electrolytes. Suggested uses: textile size, pigment binder, adhesive formulations. Introduced as: significantly new grade. Availability: commercial quantities. Morningstar-Paisley, Inc., Resin Div.

### VIRCOL-82 (organic phosphorus polyol)

MW, approx 500; SpG, 1.13 @ 20/4; Viscosity, 250 cps @ 25°C; Solubility, inverse solubility with water up to approx 50 parts/100 of soln; colorless liquid. Chemical properties: enters readily into urethane reaction with isocyanate groups. Suggested uses: flame-retarding coreactant for polyurethane foams, coatings and castings. Introduced as: product with new degree of availability. Availability: commercial quantities. Virginia-Carolina Chemical Corp.

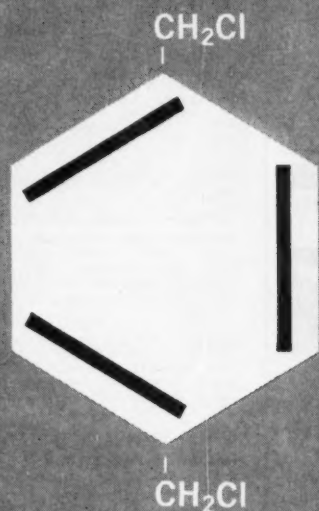
### VORANOL POLYETHERS, RS 530; RS 450; RS 410; RS 375; RS 350 (sucrose—propylene oxide adducts)

$C_{12}H_{24}O_{11}(C_3H_6O)_xH$ ; OH no. range, 530-350; SpG, 1.17; Viscosity, RS 350-30,000 cps, RS 375-40,000 cps, RS 410-75,000 cps, RS 450-300,000 cps, RS 530-2,000,000 cps @ 75°F; Volatility, % 0.5 max; viscous, light amber liquid. Suggested uses: crosslinkers for rigid urethane foam. Introduced as: new chemical products. Availability: commercial quantities. The Dow Chemical Co.



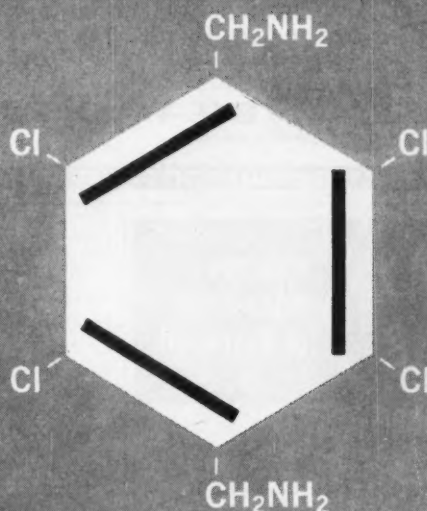
# TWO NEW CHEMICALS

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## NEW CHEMICALS FOR INDUSTRY

### WARCO 504

Constituents: polyquaternary fatty compound.  
% Active, 89.0; pH, 4.5±0.2 in 1% sol; light  
tan paste. Chemical properties: provides excel-  
lent softening of textiles without buildup of  
water repellency; provides high level of germi-  
cidal effect on the treated cloth. Suggested uses:  
as a regular textile softener or as a laundry  
softener. Introduced as: new chemical product.  
Availability: commercial quantities. Warwick  
Chemical, Sun Chemical Corp.

### WARCOCIDE 14 (tetradecyl dimethyl benzyl ammonium chloride)

% Active, 93 min; Water content, 7% max;  
Purity, 95% min (on solids basis); Solubility,  
in water; white to off-white crystalline powder.  
Chemical properties: extremely high germicidal  
properties against a wide variety of organisms;  
high hard water tolerance. Suggested uses: for  
preparing textile germicides; for compounding  
industrial germicides where a dry crystalline  
product is desirable. Introduced as: new chemi-  
cal product. Availability: commercial quantities.  
Warwick Chemical, Sun Chemical Corp.

### WARCOFIX 806 (thermosetting cationic resin)

SpG, 1.1470 @ 60 F; pH, 4.2 ± 0.5; Solubility,  
mixable with water; clear water white liquid.  
Chemical properties: unusually effective on a  
money value basis to improve wet fastness of  
direct dyes. Suggested uses: as a dye fixative  
for direct dyes. Introduced as: new chemical  
product. Availability: commercial quantities.  
Warwick Chemical, Sun Chemical Corp.

### WITCO FOMREZ ET-1500; -3000 (TRIOL)

(propylene oxide adduct of glycerine)  
MW, 1500; 3000; Volatility, wt % 0.1; 0.08;  
SpG, 1.0161; 1.0083; Hydroxyl no, 112.0;  
Pt-Co, 10.0; Gardner -2(ET-3000); Total un-  
saturation, meq/gm, 0.02; 0.04; pH, in 10:1  
methanol-water solvent @ 25 C, 6.8; 5.9; Po-  
tassium, ppm, -0.7; -1; Water content, wt  
%, 0.03; 0.02; clear liquid (ET-1500); odor,  
good (ET-3000). Suggested uses: polyether resin  
used in the production of one-shot flexible foams.  
Introduced as: new chemical product. Avail-  
ability: commercial quantities. Witco Chem Co.,  
Inc., Urethane Chems Div.

### WITCO FOMREZ ED-2000 (DIOL) (polypropylene glycol)

MW, 2000; Volatility, 0.051 wt%; SpG, 1.0046  
@ 20/20 C; Hydroxyl, 56.0 mg KOH/gm;  
Potassium, -1 ppm; Acid, 0.056 mg KOH/  
gm; Ash, wt% nil; pH in 10:1 methanol-water  
solvent, 6.7; Color, Pt-Co -25, Gardner -1;  
Total unsaturation, meq/gm 0.027; Water con-  
tent, 0.013; wt%; Gel test, flow time, sec. 2;  
Suspended matter, OK; Odor, good. Suggested  
uses: polyether resin used for preparing pre-  
polymer flexible foams, also used in combina-  
tion with polyether triols, such as Witco  
Fomrez ET-3000 for the manufacture of one-  
shot flexible foams. Introduced as: new chemi-  
cal product. Availability: commercial quan-  
tities. Witco Chemical Co., Inc., Urethane  
Chemicals Div.

### WITCURE ASPHALT CURB-MIX

Constituents: asphalt cement, filler and sand.  
Chemical properties: economical, easy and fast to  
construct; durable and not affected by ice and  
snow melting chemicals. Suggested uses: con-  
struction of asphaltic concrete curbs and gutters.  
Introduced as: product with new degree of  
availability. Availability: commercial quantities.  
Witco Chemical Co., Inc., Pioneer Products Div.

### XE-3701U SILICONE RUBBER COMPOUND (methylvinyl polysiloxane)

SpG, 1.32 ± .05; white firm solid. Chemical  
properties: good oil resistance, low compres-  
sion set at high temperatures. Suggested uses:  
to meet AMS Spec 7267. Introduced as: sig-  
nificantly new grade. Availability: commercial  
quantities. General Electric Co., Silicone Prods.  
Dept.



# U.S.I. CHEMICAL NEWS

December

A Series of Advertisements for the Chemical Process Industries

1961

## Polyethylene Liners Help Hospitals Curb Infection

Use of polyethylene liners for ham-  
pers and trash and garbage can collec-  
tion is helping hospitals control and  
reduce antibiotic-resistant strains of staph-



Polyethylene liner simplifies trash disposal.

yllococcus aureus infection. Bags come  
in buff color to mask contents. Bags are  
watertight, easily closed and can be in-  
cinerated without reopening. In addition  
to eliminating contamination by direct  
contact, the polyethylene bags reduce air  
pollution, noise, and costs for can steri-  
lization and replacement.

## Four Subjects Covered in New NFPA Publications

New and revised editions of publica-  
tions covering four aspects of fire safety  
precautions in handling chemical mate-  
rials are now being sold by the National  
Fire Protection Association, 60 Battery-  
march St., Boston 10, Mass. They are:

"Storage, Handling and Processing of  
Magnesium"—an important revision of  
the NFPA standard on this metal. 24  
pages. \$.50

"Liquefied Petroleum Gases"—revised  
NFPA standard incorporating 47 changes.  
104 pages. \$.75

"Static Electricity"—a complete re-  
vision of the previous publication on this  
subject. 60 pages. \$1.00

"Systems for the Identification of the  
Fire Hazards of Materials"—new guide  
providing a simple system of markings  
to alert fire-fighting personnel to hazards  
of any material. 20 pages. \$.50

## World's Largest Helium Plant To Be Built by Panhandle Eastern And National Distillers in Kansas

*New Unit To Supply Growing Space-Age Applications*

National Distillers and Chemical Corporation, U.S.I. parent company, and Pan-  
handle Eastern Pipe Line Company will build the world's largest helium plant at  
Liberal, Kansas. Construction of the  
plant, designed to produce one billion  
cubic feet of helium a year, is scheduled  
to start in mid-1962. It is expected to be  
completed in about two years.

### Pilot Plant Studies Show Effect of Air Failure On Vinegar Generators

Detailed data on how vinegar produc-  
tion is affected by a breakdown in the  
aeration system were recently obtained  
for a battery of sixteen vinegar genera-  
tors at the U.S.I. Research Laboratory  
vinegar pilot plant. Such air failures oc-  
casionally happen in vinegar plants.

In the U.S.I. pilot plant, circulation  
of air was interrupted for about two  
hours. The generators, which were op-  
erating under different experimental  
conditions, all showed decreased bacterial  
activity following the interruption. This  
was indicated by a lower rate of acid  
production in cycles immediately fol-  
lowing the air stoppage.

Simultaneously, there was a decrease  
in oxygen utilization, another index of  
organism activity.

### Influence of Operating Rate

There was a varying decrease in acid  
production, depending on the rate of  
operation. Generators operating at a  
high rate were more seriously affected  
than those operating at a low rate. For  
conditions in the U.S.I. pilot plant, it was

*(Continued on next page)*

The U. S. Government has signed a  
20-year contract for all the plant's pro-  
jected production as part of its program  
to conserve the nation's helium resources.

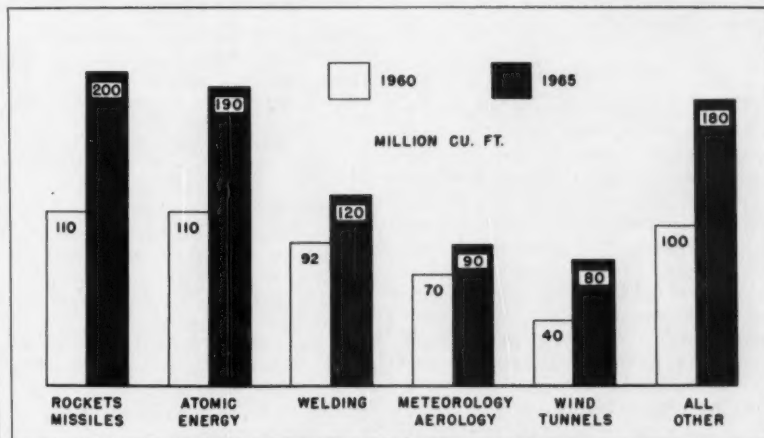
The new plant will be owned by  
National Helium Corporation, a newly  
formed company owned equally by the  
two companies in the venture.

### Booming Defense Demands

Helium, once known primarily as the  
light-weight, non-flammable gas used in  
dirigibles and balloons, is playing an  
increasingly important role in the space  
age. Basic to this demand are its unique  
properties. In addition to being inert  
and non-flammable, helium flows through  
a hole faster and diffuses more rapidly  
than any other gas. It conducts heat bet-  
ter and transmits sound faster than any  
other gas except hydrogen. It also con-  
ducts electricity better than any gas ex-  
cept neon.

Stored under pressure in missiles, he-  
lium pressurizes fuel components. It  
serves in nuclear reactors as a heat-

*(Continued on next page)*



Estimated U. S. Helium End-Use Consumption



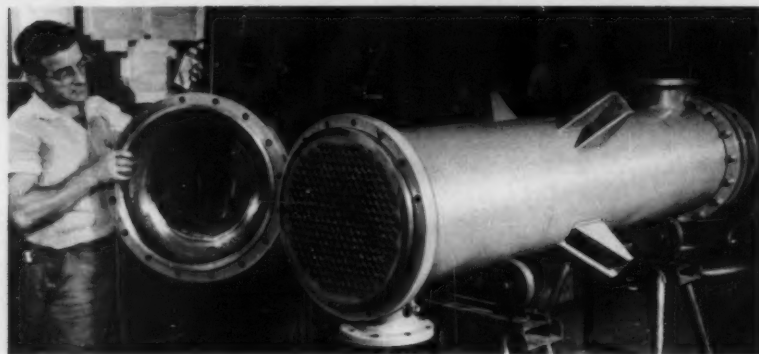


Photo courtesy of The Pfaunder Co.

## Titanium Both Tames and Cools Chlorine Gas

Heat exchangers with titanium tubes and rubber-lined shells, such as this one built for Stauffer Chemical Co. by The Pfaunder Co., are replacing glass exchangers for cooling chlorine gas as it comes from production cells. Advantages: titanium's much greater heat

transfer rate, resulting in space requirements one-eighth those of glass; titanium's great corrosion resistance, requiring minimum maintenance and permitting installation in relatively inaccessible locations.

### Largest Helium Plant (Continued)

transfer medium and as a leak detector. Another growing application is in wind tunnel studies of plane and missile design. Helium is used here instead of air because it retains its normal gaseous properties at high pressures and high velocities better than air.

Helium also functions as an inert gaseous shield in welding special metals and in some types of arc-welding. In its liquid form, it provides a cryogenic environment in which some metals become superconductors—a phenomenon utilized in advanced electronic and communications systems. Helium is used as a growth environment for transistor crystals of silicon and germanium. Other uses include its addition to breathing mixtures for deep-sea divers and to oxygen for sufferers from respiratory diseases, and its old role in balloons—now, for meteorology and aerology.

### Process Details

In the new plant, helium will be extracted at minus 300°F from natural gas that flows into Panhandle Eastern's main compressor station at Liberal. A billion cubic feet a day of natural gas, averaging four tenths of one per cent helium, will pass through the helium facility and on into the Liberal compressor station.

A major feature of the Liberal plant will be the world's largest "deep-freeze" to be used in extracting helium from natural gas. It will comprise three ten-story-high "cold-boxes" that provide a total of 200,000 cubic feet of freezing space. This makes the plant the largest cryogenics processing operation in the world.

### New Analytical Procedures

• **Chromatographic Separation of Ions in Presence of Complexing Agents.** Filter paper strip chromatography is used to separate such ions as Al, Cr(III), Fe(III), Zn, Mn(II), Ni, Co, Ba, Sr, Ca, Mg, Na, K and NH<sub>4</sub> in ternary mixtures with the addition of oxalate, tartrate and citrate as complexing agents, using aqueous alcohol as solvent.

• **Spectrophotometric Determination of Small Amounts of Alcohols.** New spectrophotometric method for determining small amounts of methyl, ethyl, butyl and amyl alcohols is especially useful when organic solvents are employed in extraction processes. Sensitivity is of order of 10 µg/ml of test solution in case of ethyl and methyl alcohols.

### Need Alcohol Regulations?

You can still get your personal copy of A&TTD's latest regulations on the distribution and use of specially denatured and tax-free alcohols from U.S.I. Write to Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., New York 16, N. Y.

### Vinegar Studies (Continued)

indicated that a two-hour interruption would have little or no effect unless the generator is producing at a daily rate above 16 gallons 100 grain vinegar per 100 cubic feet of packing.

All generators ultimately returned to normal, with recovery times extending up to 38 days for some units.

From these data, it appears that a plant experiencing an air failure can expect a sharp loss in capacity from which it will take some weeks to recover.

### TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

**New water-based adhesive** has been developed for laminating aluminum foil to paper, plastics and other surfaces. Product is said to dry transparent, form strong, flexible bond. Applied by conventional coating machines, flow or spray gun. **No. 1780**

**Comprehensive bulletin on n-butyl alcohol** is now available. Covers specifications, physical properties, chemical references, resin solubilities, extensive list of binary and ternary azeotropes. For surface coating, chemical industries. **No. 1781**

**Quantitative filter paper** is now available in a special protective polyethylene wrap. Wrapper is said to seal out any trace of dust or dirt that might affect purity, cleanliness and freshness of paper as packaged. **No. 1782**

**Uses of diallyl phthalate monomer** in polyester resin systems are described in new bulletin. Covers systems used in various resin fabrication techniques as well as use of monomer as carrier for catalysts, pigments, other additives. **No. 1783**

**New gas density cell** said to provide continuous precise measurement of gas density in pounds per cubic foot, has been introduced. Valuable to gas and chemical industries by making it possible to determine mass flow of gas. **No. 1784**

**Carbon-14 and tritium compounds** are described in a new listing of 139 ready-for-delivery isotope labeled materials. Information includes specifications, packaging and prices. Compounds are used in chemical and biological research. **No. 1785**

**Sterol absorption base derived from pure lanolin** is subject of new bulletin. Claimed to be dermatologically innocuous, material functions as emulsifier, emollient and penetrant in cosmetic and pharmaceutical preparations for topical use. **No. 1786**

**A completely automatic titrator** has been developed. Design is said to permit unattended operation, from measurement of sample through all steps until results appear in digital form. Even back titrations can be automated. **No. 1787**

**Basic Principles of Fission Reactors** is the title of a new book now being sold. Takes the reader to the stage at which detailed reactor design begins, without assuming previous knowledge of nuclear technology. **No. 1788**

**Polyethylene-covered platinum electrode** can be used to monitor production and to control aeration of yeast propagation in large and small vessels, recent tests show. Problem of residual currents common with other electrodes is negligible. **No. 1789**

Please use number when writing.



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# Technology

## Newsletter

CHEMICAL WEEK  
December 16, 1961

**A 15% improvement in cell operation in aluminum production** is claimed by British Aluminum Co., Ltd. and Kaiser Aluminum and Chemical. Details of the development are reportedly being readied for presentation at the New York meeting next February of the American Institute of Mining, Metallurgical and Petroleum Engineers. In the meantime, the two companies say only that the development utilizes refractory hard metals as essential elements in the cell.

It's been known, however, that British Aluminum holds British patent rights on titanium and zirconium diborides and carbides and Kaiser had an exclusive license in this country (*CW*, Aug. 6, '60, p. 74). Presumably, the refractory materials are employed as cathode bars to cut voltage. Now-in-use steel cathode bars need protection from the molten alumina. A carbon lining, often 15-in. thick, does the job. By eliminating this distance, it would be possible to cut power requirements and increase capacity.

**A vote of confidence in Strategic-Udy's steel process** has been issued by the Bureau of Mines, which, however, feels that cost estimates for the process are somewhat optimistic.

The Area Redevelopment Administration has been considering a proposal made by Gulf States Land & Industries, Inc., in cooperation with Anaconda Copper and Koppers to make steel from the vast copper slag heaps at Anaconda's operations near Butte, Mont. Under ARA's depressed areas aid program, the project would get a \$6.3-million, 25-year, 4% loan. The proposal calls for production of 154,000 tons of pig iron annually and 200,000 tons of refined steel ingot. Also envisioned: annual by-product production of 1,730 tons of copper and 4,340 tons of zinc.

The Bureau has studied the proposal, finds it "generally feasible." It predicates a capital cost of \$41.4 million, rather than the \$37 million estimated by Koppers, however. Similarly, it places direct manufacturing costs at \$29.25/ton for pig and \$44.84/ton for steel, instead of the \$25.11 and \$38.03 estimates of proponents. Still, the Bureau feels the project would operate at a gross profit that could be used to amortize the debt.

The process under consideration is the Strategic-Udy technique employing a rotary kiln (*CW*, Dec. 26, '59, p. 34). It has been tested on iron ores and on copper slag. In the proposed plant, it would employ a mixture of copper slag and magnetite.

**Two new aerosol valves were major highlights** of the Chemical Specialty Manufacturers' Assn. meeting in New York City last week:

(1) Metered valve (U. S. 3,003,662) is a development of Emson Research (Bridgeport, Conn.). It's designed for use with immiscible propel-



# Technology

## Newsletter

(Continued)

lants (i.e., nitrogen, nitrous oxide or carbon dioxide), reportedly can dispense any flowable product as liquid, foam or spray. Emson says the loss of gas (and resulting waste of product), common to many types of valves used on immiscible propellants, has been eliminated.

(2) The plastic valve, now being mass-produced in France and Italy, will be marketed by Airkem Inc. (New York) early next year. The firm has purchased all U. S. rights to the product, which does not require a metal mounting cup or an extensive crimping process.

A new anionic surface-active agent is being marketed by Dow as Benax 2. It's sodium dodecylated oxydibenzene disulfonate. The presence of two benzene rings makes it possible for the compound to maintain its solubility and surface activity in highly concentrated electrolyte solutions in which other surface-active agents are insoluble.

Dow states the case for the new product as follows: In all-purpose cleaner formulations, sodium xylene sulfonate (SXS) is used to solubilize the alkylbenzene sulfonate (ABS). A 20% active solution is normally obtained by mixing 20% ABS and 10% SXS. Its new product, on the other hand, can achieve a 20% active solution with a ratio of 10% ABS, 10% Benax 2 and 10% water.

**The need for a high-temperature nuclear heat reactor** has been pinpointed in a study made by the Stanford Research Institute for the Atomic Energy Commission. The study (available from the Office of Technical Services) says that 410 products within six major industries require HTH (heat of over 1500 F) in their production. The primary metals industry accounts for about one-half of the total demand for such heat; stone glass and clay, 30%; chemicals and allied products, 10%.

Looking to the future, the study sees a 1970 need for HTH of 3.5-4.0 quadrillion Btus. But while making a strong case for the need, SRI cautions that the economic feasibility of a nuclear reactor to produce 5 x HTH has not been determined.

**Two new crab grass killers** were revealed by Eli Lilly researchers at this week's meeting of the Weed Society of America in St. Louis. One, trifluralin, will be available to consumers next year. Research on the other, dipropalin, is continuing. Both have been tested on more than 3,500 turf plots and, according to Lilly, give excellent control in unusually small amounts.

**A nonsmearing de-icer for windshields** will be marketed by Du Pont. In addition to an unidentified ingredient to prevent residual smear, the product features a propelled stream, instead of a cone-shaped spray. Object: better application control.



# Season's Greetings

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OXALATES • CHLOROTHIOFORMATES • ORGANOSULFUR COMPOUNDS • HERBICIDES  
FUMIGANTS • ALUMINUM ACETYL SALICYLATE • LIQUID SULFUR DIOXIDE • SULFURIC ACID • ALUMINUM  
BORIC ACID • CARBON TETRACHLORIDE • SODIUM FLUOBORATE • SULFUR CHLORIDES • INSOLUBLE SULFUR  
ELECTRON BEAM FURNACES • PVC ELECTRICAL CONDUIT AND FITTINGS • ALUMINUM FLUORIDE • PHOSPHATES OF  
CALCIUM, IRON, POTASSIUM AND SODIUM • SALT CAKE • COLUMBIUM AND TANTALUM PENTACHLORIDES • C  
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HYDROSULFIDE • SULFURS • PHOTOGRAPHIC CHEMICALS • REFRACTORY METALS • BATTERY BOXES AND FITTINGS • HYDRO  
PHOSPHORIC ACID • PHOSPHATES • FORMIC ACID • FORMATES • SULFUR COMPOUNDS • HERBICIDES • INSECTICIDES • MITICIDES •  
SULFUR DIOXIDE • SULFURIC ACID • ALUMINUM FLUORIDE • BOP  
SULFUR CHLORIDES • INSOLUBLE SULFUR • CHELATING AGENTS • ALUMINUM FLUORIDE • PHOSPHATES OF  
COLUMBIUM AND TANTALUM PENTACHLORIDES • C  
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HYDROSULFIDE • SULFURS • PHOTOGRAPHIC CHEMICALS •  
SULFURIC ACID • SODA ASH

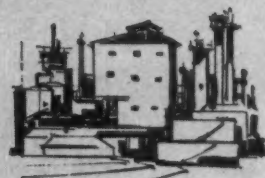
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INDUSTRIAL CHEMICALS DIVISION • INTERNATIONAL DIVISION • A. R. MAAS CHEMICAL COMPANY DIVISION • METALS  
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# FRONTIER



Vulcan Materials Company (of which the Frontier Chemical Company is a division) has acquired the Kolker Chemical Corporation of Newark, New Jersey. The Kolker facilities will be operated by Frontier, making and marketing benzoic acid and derivatives, plasticizers, methyl bromide and chlorinated solvents in addition to the regular Frontier line of products. This acquisition represents another step in the planned growth of Frontier. In addition to a


## EXPANDS

wider range of products for customers throughout Mid-America and the southwest, Frontier friendly service on all products is now available to Eastern markets. Through the progressive development of new facilities and products, Frontier will continue to expand into broader chemical markets. The resources of Vulcan Materials Company, one of America's 300 largest corporations, solidly reinforce this expansion program. Frontier is delighted to receive the

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## ENGINEERING

# Quick Cook Cuts Pulp Costs

**Semihydrotropic pulping's bonus: water needs  
cut 95%; chemical costs reduced to 50¢/ton.**

A new wood-pulping process, semihydrotropic pulping, developed by industry consultant Ralph H. McKee, is now emerging as the latest of a half-dozen recent processes designed to slash papermaking costs. Keys to McKee's process savings: 90% of chip solids weight ends up in finished paper (vs. 50% by most conventional processes), low initial investment, low water requirements.

McKee's process, a refinement of his sodium xylene sulfonate process developed in '42, has been piloted in a couple of mills, is now getting full-scale tests at an undisclosed paper mill in Michigan. If these tests confirm McKee's predictions, semihydrotropic pulping may offer strong competition for the markets currently served by groundwood pulp and some grades of kraft. Its product, an unusually smooth, high-lignin-content brown paper, is of higher quality than most kraft paper. And because the process is said to use only 5% as much water as the kraft process (which requires about 170,000 gal./ton) and since investment costs (\$1 million for a 100-tons/day mill) are half that of an equivalent kraft paper mill, McKee claims he can save \$30/ton on finished pulp.

**Chemicals or Catalyst:** Key feature of the process is its use of a hydrotropic salt—a salt whose water solution will dissolve more of a slightly water-soluble material than will pure water itself. Since the hydrotropic salt is not involved in the reaction, McKee calls it a catalyst.

A variety of hydrotropic salts, such as alkaline salts of benzoic acid, cymene sulfonic acid, etc., can be used for pulping wood and cellulose fibers. But McKee's choice is sodium xylene sulfonate because of its relatively low price (5¢/lb. if made at the paper mill) and because it gives a faster cook (two to three hours at 280-350 F) than do any of the others.

McKee first proposed sodium xylene sulfonate for making paper pulp nearly 20 years ago (Canadian patent

407,066). This process—shown to have advantages such as mild cook, reduced stream pollution, high yield, low investment—never made the grade commercially because the sulfonate was relatively costly, couldn't be cheaply recovered, and the end-product was a dark brown, kraftlike material. In his new process, McKee counters the first two objections so strongly that the third—dark paper color—no longer looms large.

**Quick Cook:** In this new process are two money saving changes: cooking temperature has been reduced from 350 F to 280 F, and concentration of sodium xylene sulfonate has been cut from 30% to 1-2%.

As a result, the pentosans (class of complex carbohydrates) are removed and (unlike the '42 process) almost all of the lignin remains. Yields are thus over 90%, based on bone-dry chip weight. The paper product is equivalent to unbleached kraft or groundwood (for bags, paperboard boxes, etc.), and reduced chemical losses (because of reduced concentrations) trim over-all chemical costs to an estimated 50¢/ton of pulp.

Presence of the lignin in the semihydrotropic pulp offers both an advantage and a disadvantage. On the plus side, the paper is self-sizing—i.e., the paper has a glossy finish, since the lignin is fused on the papermaking machine. But the paper cannot be bleached white.

Since little of the lignin is dissolved in the wood chip digester, the pulping liquor (which resembles the "white water" of bleaching and papermaking processes rather than the "black liquor" of conventional digesters) may be recycled about a dozen times. And the process is continuous.

**The Process:** Wood chips and pulping solution together are fed to a tall, thin digester tank sized for about three hours' holdup time. Live steam is injected to hold the temperature at about 280 F, and the pulp slurry is drawn off the bottom. This slurry is first passed over a screen belt to drain



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## ENGINEERING

off the bulk of the pulping liquor, then fed through screw presses, where the fiberized pulp is pressed until a one-to-one ratio of liquor to wood is left.

From the screw presses the pulp is mixed with wash water and run through a series of disc refiners (grinders) to a final screw press. The pulp leaving this press reflects to a large degree the color quality of the raw wood chips. It is ready for use in applications such as paperboard. If higher quality is desired, it can be further washed and screened; and sizing, dyes, etc., may be added before it is passed to a calendering machine. Because of the high lignin content, however, bleaching to a high white is not recommended.

By using a sealed pressure vessel instead of an open digester, the process can be varied to dissolve more or less of the pentosans. Steam pressure and corresponding boiling point of the solution can be raised. However, high pressures (over 100 lbs./sq.in. gauge) are not recommended, since a darker pulp will result. Since the losses in the final washing and pressing stages are sufficient to carry off the pentosans dissolved from the wood, a regeneration cycle is not necessary.

**Method for Makeup:** Cost of chemicals is one of the most controversial aspects of hydrotropic pulping, so McKee has prepared a recommended process and corresponding cost estimates, based on his own experience. He says that sodium xylene sulfonate satisfactory for digester processing can be made from commercial grades of xylene, sulfuric acid and caustic soda.

In his process a reaction tank equipped with cooling coils or water jacket is half filled with sulfuric acid (66 degrees Bé). Xylene vapors are fed into the bottom of the reactor until escaping vapors indicate that all the acid has been reacted. Then the resulting mixture is cooled, diluted with water and neutralized with the caustic soda (50% solution).

**Pulper Reaction:** None of these steps sounds complex, but plant operation often turns up unforeseen problems—one of the reasons why hydrotropic pulping processes have aroused a host of skeptics in the industry. McKee feels that the paper industry distrusts hydrotropic pulping because it fails to grasp the principles

of the process. Once that distrust can be overcome by familiarity with the process, he feels, his technique will be used to advantage.

Of course, McKee isn't neutral on the matter, but he has had long acquaintance—he is 88 years old—with most of the current industry methods and techniques. Besides being one of the four founders of the Technical Assn. of the Pulp and Paper Industry, he organized the first pulp and paper school in the U.S. (University of Maine), has been official chemist of the American Pulp & Paper Assn. and a consultant (e.g., to Oxford Paper, Tubize-Chatillon, Celanese Corp.). Now, he hopes, the current trend toward water savings and cost-reducing processes will increase the industry's willingness to try his method.

## Cracking Hydrogen

On the heels of Cities Service Petroleum Co.'s disclosure that it was building a plant to hydrocrack residual oils with the H-Oil process (CW, Dec. 9, p. 30), Hydrocarbon Research, Inc., gave the industry a preview of the process's expected hydrogen consumption.

At a meeting of the American Institute of Chemical Engineers in New York last week, S. C. Schuman—speaking for HRI, licensor of the process and contractor for the Cities Service unit—cited data tailored to a specific-charge stock—1,080 molecular weight, 1% sulfur (typical Kuwait vacuum bottoms). They provide a rule-of-thumb for the estimate that 220 billion cu.ft. of hydrogen will be needed for hydrocracking in '65—almost half of current estimated consumption.

**Empirical Reactions:** To measure potential hydrogen consumption in the H-Oil process, Schuman constructed a model including five generalized and simultaneous reactions (1) hydrogenation of unsaturated aliphatic (chain type) hydrocarbons, (2) hydrogenation of sulfur compounds to hydrogen-saturated products and hydrogen sulfide, (3) cracking to produce unsaturated (olefinic hydrocarbons and hydrogen, (4) hydrogenation of aromatic (ring type) hydrocarbons to saturated aliphatics, (5) hydrogenation of unsaturated naphthenic bonds.

**On the Curve:** This model yields a curve in which hydrogen consump-



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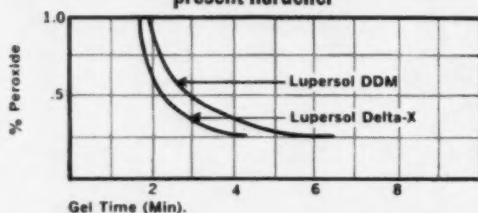


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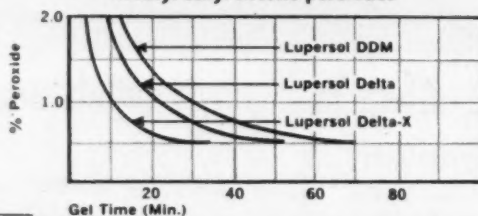
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## ENGINEERING

tion varies with mean molecular weight of product. It points to infinity as the molecular weight nears 100, to a minimum as it approaches 1,000. At the optimum, consumption varies between 430 and 600 std. cu.ft./bbl. as the mean molecular weight of product varies between 350 (e.g. fuel oil) and 250 (kerosene). Wider ranges, listed in the AIChE paper, indicate 380-700 std. cu.ft./bbl. as molecular weights vary from 400 to 200. Hydrogen consumption in the hydrocracking processes will fall within these limits.

## More Gas to the Blast

Steel Co. of Canada (Toronto), largest steel producer in the Dominion, has taken a five-year option with United Gas of Canada to supply natural gas for production of pig iron from blast furnaces.

Steelco thus follows Dominion Foundries & Steel, Ltd. (Hamilton, Ont.) and Dominion Steel and Coal Corp. (Sydney, N.S.) as the third Canadian firm to substitute hydrocarbons for coke (*CW*, July 8, p. 63).

Since both Dofasco and Dominco use fuel oil in their blast furnaces, Steelco's option to buy gas indicates a broadening of the trend. The firm began experimenting with gas injection in two of its four furnaces last spring. And since Steelco is Canada's second-largest coke producer (191 coke ovens), its recent switch is even more significant.

United Gas, in an interim report to stockholders, had stated earlier that it was negotiating to supply large amounts of gas for use in blast furnaces, but did not name Steelco. The stockholders' report added that the deal would yield less than the normal unit profit margin because of the "competitive situation."

## Fewer Freshmen

For the fourth year in a row the number of students enrolling in freshman engineering courses at U.S. universities has declined. A report prepared by the Engineering Manpower Commission (New York) shows that total enrollment has dropped from 78,700 in '57 to 65,700 in '60. At the same time, the percentage of total students enrolled in engineering has dropped from 10.8% in '57 to 7.3% in '60.



Since roughly half of all the students who enroll in engineering courses obtain their degrees, the projected output will drop to about 32,000 by '64, compared with about 37,000 this year. Thus the current much-publicized engineering shortage not only will continue but also will become more critical.

## PROCESSES

**Chemical Plating:** The Soviets claim that their first fully automated process to plate metal with nickel chemically has been put into commercial operation in Leningrad. The process uses a solution of nickel sulfate (40%), sodium thiosulfite (20%) and maleic acid (40%), which is recycled continuously. Lean solution leaving the plating reactor at 190 F is cooled to 130 F, filtered, treated with nickel sulfate solution and a 25% ammonium solution to control pH to 4.9-5.5, reheated to 190 F, and fed back into the reactor.

**Uniform Urethanes:** A new U.S. patent (3,005,624), assigned to Mobay Chemical (Pittsburgh, Pa.), defines dynamic pressure of chemicals in the mixing chamber as the key to uniform urethane foams. Previously, additives—e.g., paraffin or silicone oils—have been used to control pore size of the foam; but these additives can affect end-use properties. The new patent claims to use pressure to control cell structure, etc., without the use of additives.

**Hot Carbonate to Canada:** The hot carbonate process, which uses solutions of potassium carbonate to absorb hydrogen sulfide and carbon dioxide gases from natural gas, will be installed by Jefferson Lake Petrochemical in a plant at Calgary, Alta. There has been industry controversy over the merits of the hot carbonate process compared with the amine processes, and the Jefferson unit will be an important commercial test. The plant will be designed to handle 150 million cu.ft./day of gas containing 17% hydrogen sulfide and 8% carbon dioxide. Benson Field and Epes, licensors for the process, have appointed Humphreys & Glasgow Ltd. as Canadian agents, but designers of the Jefferson Lake unit have not been specified.

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				Toluene	Naphtha	
EM	8.01	120	5.2 hours	5.3	Imm.	1.60
EE	7.72	140	6.4	6.6	1.1	2.00
EB	7.49	165	42	5.2	2.2	3.15
DM	8.47	200	210	4.6	Imm.	3.42
DE	8.22	205	244	6.4	0.6	3.85
DESG	8.51	215	960	2.7	Imm.	5.92
DB	7.92	230	940	6.5	1.9	5.17
PM	7.65	100	3.3	5.2	0.9	1.86
DPM	7.91	185	90	4.2	0.8	3.57
TPM	8.03	250	1300	3.1	0.7	5.80
P-Mix (mixture)	7.86	120	21	4.1	0.7	3.11

\* Relative evaporation time in hours. 25% of the sample at 74°F. and 50% relative humidity.

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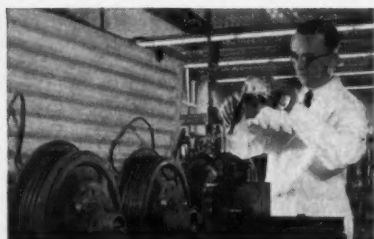
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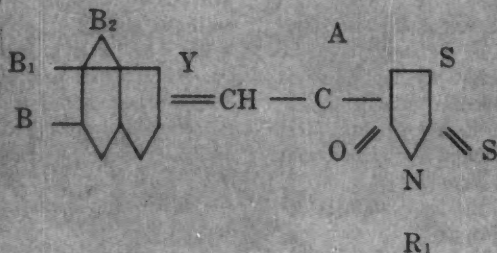


где: В — высокомолекулярный алифатический остаток с числом атомов углерода не менее 11, или соответствующая ациламиногруппа, например В —  $C_{17}H_{35}$  или  $NHCO C_{17}H_{35}$ ;

В<sub>1</sub> — Н или хлор;

В<sub>2</sub> — Н или  $COOH$ ,

применяют сенсibiliзирующие красители, устойчивые в процессе выстаивания эмульсии, например мероцианиновые красители производные роданина, в частности строения II



где: Y — O, S или Se;

A — H, алкил- или алкоксигруппа;

B — H,  $OSCH_3$ ,  $NHCOCH_3$  или  $C_6H_5$ ;

Russian patent on emulsions typifies technology offered to U.S.

## Soviet Science for Hire

**Here's a close look at Soviet-bloc patents and process licenses offered to U.S. companies.**

Russia and its European satellites are putting a "for sale" sign on a growing number of home-grown chemical products and processes, and inviting Western nations to take their pick. And at least two enterprising U.S. firms are seeking to cash in on the marketing of Iron Curtain technology in this country.

(1) National Patent Development Corp. (New York) has licenses available on a conventional royalty basis for proved Soviet processes now

being patented in the United States.

(2) Robert S. First, Inc. (New York), in a joint effort with Petrole-Chimie (Paris), expects to complete a survey (by March 1, '62) of about 600 processes and products available for licensing from Iron Curtain countries.

In Canada Humphreys & Glasgow Ltd. (Don Mills, Ont.) is offering rights to about 50 chemical processes now used in East Germany.

**Right for Sale:** NPDC, a U.S. firm

engaged in licensing patents and searching for new products, contacted Russian authorities a year ago. Last June, NPDC President Jerome Feldman visited Moscow, came back with complete rights to 60 of the 100 patent applications that the Russians have filed in the U.S. The patents are being offered by NPDC for licensing to U.S. firms. A sample of technology available:

**Organic semiconductors:** The Russians have applied for at least four U.S. patents on specific methods of making semiconductors from a family of polyacrylonitrile-based materials. Claimed to be stable up to 700 C, operating at 0.6-0.8 volts, the noncrystalline materials reportedly can be produced in conventional fashion.

**Bismuth telluride thermoelectric elements:** Claimed advantage for these materials—which are covered in 14 applications for patents in the U.S.—is high Z-factors (3.1 in some cases). The elements are able to efficiently convert heat into electricity. Also, they reportedly do not require a high degree of purification.

**Phenol-formaldehyde resin:** Several patents cover a continuous, automatic process that reuses evaporated liquids. The resin yield reportedly is five times higher than in the conventional batch process and the Russians claim safety and low processing cost.

**Building materials:** A process is offered for fine-grained building materials—one composition mentioned is 90% sand, 10% lime—that can withstand compression up to 2,000 kg./sq.cm. Called Silikalsit in Russia, the material is claimed to be 65% lighter than concrete, cheaper, easier to make and longer-lasting.

**Chemical Grab-Bag:** NPDC also can arrange for rights to the following Soviet-bloc processes: isoprene from isobutylene and formaldehyde; acetaldehyde made with a nonmercury catalyst; phenol and acetone from isopropylbenzene; caprolactam from benzene via nitrocyclohexane; continuous polymerization of caprolactam; butadiene from butane; aniline by the catalytic reduction of nitrobenzene with hydrogen; polypropylene, polyisoprene and ethylbenzene.

NPDC has a brief description of each of these chemical processes, will



## DIMENSION

## Inside Russia's Patent System

Should there be an increase in trade (of information or products) between the U.S. and Iron Curtain countries, U.S. firms will have to bone up on Soviet patent law, for they may wish to take out patents in those countries.

With an eye toward improving trade relations with Russia, some West European firms have been issued patents in Russia. Recently, a chemical shipment from a West German firm was canceled by Russia when it was learned that an Italian firm had been granted a Soviet patent on the chemical process. The Italian company won the business.

Since the basic purpose of the Soviet patent system is to promote wide internal use of novel developments — rather than to protect individual inventors — the system, by Western standards, has several unattractive loopholes. The number of patents issued to Westerners is so small that between '56-'59 there was one report of patent royalties being paid to a firm outside the Soviet bloc — about \$4 million to a Swedish holder of a patent on shop machinery.

Patent law varies only slightly throughout Communist countries, has practically no provisions for infringement suits. But a patentee is almost assured of monetary reward when he takes the most common, most easily attainable type of patent—an author's certificate.

U.S.S.R. law requires that an author's certificate be promptly put to use. The certificate is free and yields royalties to the inventor free of Soviet taxes. An exclusive patent can be granted only when a development has been achieved without state support. But it requires costly annual fees, carries no fringe benefits, may be used in Russia only when there is no alternative.

Certificate royalties are paid by the government to an inventor for a maximum of five years (life of an exclusive patent is 15 years). Royalties are based on a percentage of yearly savings to Russia attributable to an invention or innovation. The reward for an innovation (equivalent to a suggestion box idea) is half

the rate of an invention payment.

At the bottom of the scale an invention that saves up to \$100/year is worth 25% of the saving (but not less than \$20). At the top, an annual saving of \$100,000 or more earns 2% (but not more than \$20,000).

**What's Covered?** Patents and certificates are granted on chemical processes but not on products obtained by chemical means. However, the actual wording of the issued patent or certificate does not necessarily cover all aspects of a process. A short statement of the coverage desired, rather than any extensive claims, is preferred by most of the 900 consultants who judge patent applications in the U.S.S.R.

No procedure exists for consultation between the patentee and the patent office before an application is granted or denied. Consequently, in some cases an issued patent differs so from the original application that the patentee must appeal.

Moreover, if the application is denied, it is made public. Russian reasoning: the main cause of denial is lack of novelty; the Soviets then see no reason why the development should not be made public. Of the 38,000 patent applications in Russia (300 of which were from non-Russians) in '58, 25% were granted.

**Close Timing:** Timing is important in international patenting, since a public disclosure before filing application will nullify rights to patent. The International Patent Convention gives an inventor in a member country the right to make an application in any other member country within one year of the first application and have coverage from the date of the first filing. But Russia does not belong to the convention, and it grants or denies an application for a patent or certificate in about four months.

A patentee must keep close watch on the actual date of patent issue in Russia and the date it is made public. A British patent authority has shown that confusion created by publication prior to issue makes it simple to read a patent abstract in a regularly dispatched bulletin and then patent the development in Britain or the U.S.

negotiate on behalf of U.S. companies. It will deal both directly and through Amtorg Trading Corp. (New York), a Russian agency set up to handle business with Americans.

NPDC also has rights to, and full information on, a Russian process for piping natural gas into blast furnaces. And three U.S. patents (e.g., U.S. 2,548,377) that cover a process for making liquid oxygen are now available for licensing. They were issued to the Soviet government in '51. Other applied-for patents covering synthetic fur, a turbine petroleum drilling unit, machine tools and medical equipment are being handled by NPDC.

Where needed, the Russians guarantee that they will supply know-how, either through literature or by sending technical advisors. NPDC, in turn, will guarantee know-how along with a license.

Early in NPDC's negotiations, Russian officials were seeking to sell processes outright. (They were asking \$20 million for one process.) Now NPDC is confident that the Russians will accept royalties plus an annual minimum—in amounts compatible with U.S. practice.

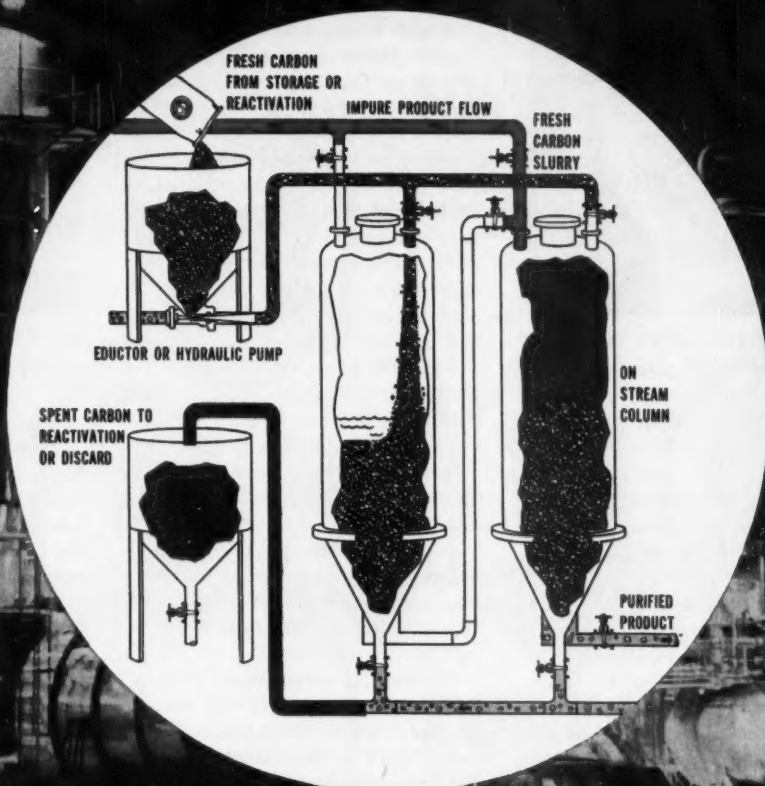
**Process Survey:** Robert First's service (*CW Technology Newsletter*, March 11) is billed as concentrating on "new, unique or lower-cost products or processes" available in Eastern Europe. It briefly describes the process or product; its advantages and markets; availability and terms of the license for patents and know-how; and the name, address and telephone number of the proper contact in Eastern Europe. Cost: \$4,000-6,000 per section, depending upon how many sections are bought. (Available are sections on petrochemicals, organic chemical specialties, inorganic chemicals, polymers, pharmaceuticals, and CPI equipment and instruments.)

In First's process potpourri: terephthalic acid, isophthalic acid, 2-methyl-5-vinylpyridine, caprolactam purification and polyvinyl alcohol.

**From East Germany:** Humphreys & Glasgow (London), a chemical engineering firm, has licensed several East German developments that are available for relicensing to U.S. firms through H&G's Canadian affiliate. Included: processes for the production and spinning of polyacrylonitrile, polyamide, polyester and viscose fibers



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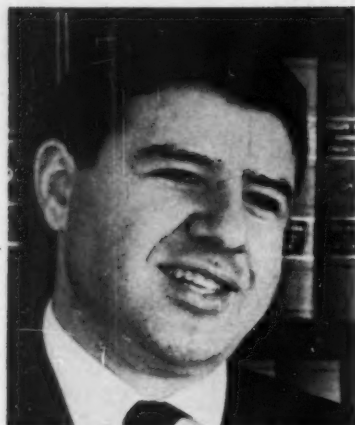
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**NPDC's Feldman: Offers sublicenses on Russian chemical developments.**

as well as know-how in plasticizers and various areas of carbide technology. H&G has an agreement with East Germany for two-way purchase of information and processes covering products such as caprolactam and methylamine.

American firms may also, of course, contact Iron Curtain countries directly to arrange licensing. In Hungary the state licensing enterprise is Licensia (Budapest). The Czech office in Prague is called Polytechna and the Warsaw, Poland, office is called Polimex.

The Russian patent office is called the Bureau of Inventions and Discoveries at the Council of Ministries of the U.S.S.R.

But these government bureaus would probably be only the first of many contacts, for Soviet-bloc negotiations are anything but simple.

Some U.S. companies have had technical dealings with Eastern European countries but usually in supplying know-how rather than buying it. For example, Von Kohorn International (White Plains, N.Y.) and Intertex International Corp. (New York) have installed synthetic fiber plants in Russia (*CW*, March 11, p. 53).

Back in '59, Rand Development Corp. (Cleveland) opened a Moscow office to appraise Soviet technology and possibly arrange patent licensing (*CW*, April 11, '59, p. 90). However, when the U-2 incident flared up, negotiations came to a stand-still and Rand packed up shop. The firm has no plans for undertaking a similar venture.

Several European companies have

sold products and know-how to Iron Curtain countries. But when these firms were solicited by the Soviets they found the proffered products and processes to be commonplace.

**British Experience:** No British firm (except H&G) is known to have licensed an Iron Curtain process, but Imperial Chemical Industries (London) is reportedly interested in Soviet caprolactam technology. The Russians have sent lists of available processes to England, but these have covered only standard inorganic products and some petrochemicals. Know-how was offered, but not for new products.

However, the British firms have had considerable experience in negotiating sales to the Russians. ICI has licensed a polyester fiber plant and production know-how to Czechoslovakia. And the firm is building four polyethylene plants, one each in Czechoslovakia, East Germany, Poland and Rumania.

Courtaulds, through its subsidiary Prinex Ltd., has sold Russia \$42 million worth of plants and processes for viscose rayon, acrylic staple fiber and cellulose acetate yarn.

**European Confirmation:** France's Pechiney has not taken any licenses on Iron Curtain developments, but it has licensed processes for chemical and aluminum plants in Czechoslovakia, Poland and Yugoslavia. And, while there's no known case of a West German chemical firm acquiring an Eastern-bloc license, the Iron Curtain countries are greatly interested in West German chemical developments.

The consensus of British companies that have negotiated with the Russians is that it is an arduous process at best. Any concession made by a Western firm is noted by the Russians and brought up in successive talks with the same or other firms. British firms try to keep tabs on each other's licensing activities so that unexpected concessions will not be given. Western negotiators say they must take a firm line, be tough, put a limit on how far they will go with concessions—and be prepared to return home empty-handed.

However, the British, and others who have dealt with the Russians, agree that when a contract is signed, it is carried out to the letter. Western negotiators disagree, though, on whether the Russians would pass a licensed process on to Soviet satellite



**First's First: Surveys Soviet-bloc technology available to American firms.**

nations. None discount the possibility.

**Possible Motivations:** What's behind the new Red-bloc licensing offers? One observer thinks that lack of know-how may be the key motivation. He believes that the Eastern bloc has not been able to copy U.S. processes successfully by using patents alone. They need additional know-how. By offering some of their own processes to the U.S.—so his theory goes—the U.S.S.R. hopes to loosen up American firms and pry out needed know-how.

Another possible Russian motivation: to build up its supply of U.S. currency. NPDC's Feldman (see picture, left) estimates that process royalties could bring the Russians almost twice the number of dollars they now get from trade. In any event—and "cold war" considerations aside—the Reds will have to offer solid value to attract takers in the U.S.

## Plant Disease Fighters

**Antibiotics are being evaluated** in U.S. Forest Service tests to determine their effectiveness against commandra rust, a widespread disease of certain types of pine trees. This and other chemical methods were studied at this week's annual meeting of the American Phytopathological Society, which was held in Biloxi, Miss.

The antibiotics are two derivatives of cycloheximide (the semicarbazone and the methylcarbazone), which are applied to the trunks of the trees in an oil emulsion and to the leaves as water sprays. Early results have been promising, but more extensive





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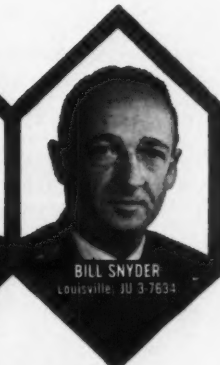
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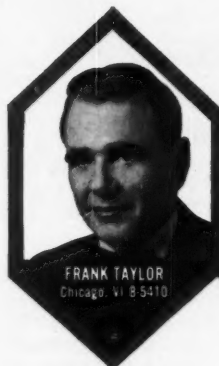
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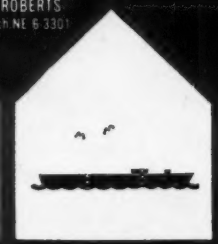
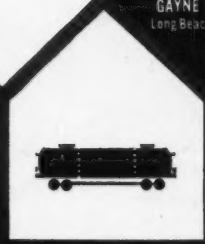
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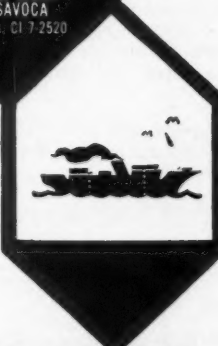
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# NEWS BRIEFS

## ON THE CREATIVE USE OF



*Photo courtesy of Molded Fiber Glass Boat Company, Union City, Pa.*

### **Plastic Molder of boat hulls beats a costly craze**

The lapstrake design in boat hulls offers greater lateral stability than a smooth hull. When press molding such a shape with reinforced plastics, considerable difficulty may be experienced with crazing on the outside radii of the laps where the closing die tends to pull the reinforcing fibers away from the outer edges of the strakes. The resin-rich areas at these points shrink and cause the plastic to craze, thus weakening the hull where the greatest strength is needed.

One manufacturer was able to overcome this problem with the use of a 33% loading of ASP-403, an organophilic MCP aluminum silicate pigment. By absorbing some of the reaction heat, the ASP reduced the peak exotherm, and prevented excessive shrinkage. It also provided improved flexural strength, flexural modulus, reverse impact resistance, and a more uniformly smooth surface. Similar results have been experienced by some sports car body manufacturers and other die molders of impact resisting reinforced plastics.

MCP's aluminum silicate pigments (ASP's) find many applications and may overcome your molding problem. Send the coupon for details.

## **Minerals & Chemicals Philipp**

9046 Essex Turnpike, Menlo Park, New Jersey

EXPORT DEPT.: Room 150, Garden State Parkway, Menlo Park, N. J. (Cable Address: "MICOR")

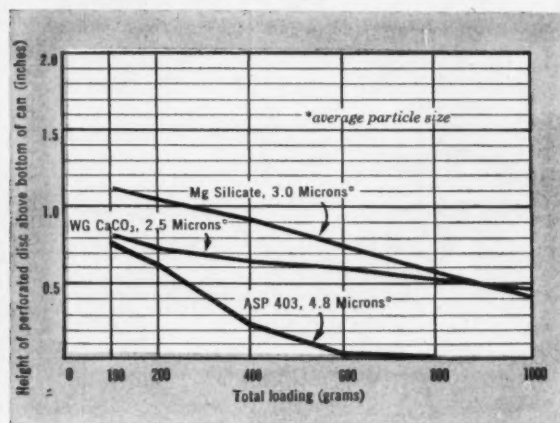


**ASP's put "tack"  
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Aluminum Silicate Pigments (ASP's) increase tack, speed adhesion, do not settle, and offer good color properties for adhesives. If you need a real sticky adhesive, ASP's could be the answer... just check and send the coupon.



# MCP PROCESS MATERIALS



## Paint Formulators

discover better suspension properties of organophilic ASP's

That paint pigments settle is common knowledge. Some pigments tend to settle more rapidly than others, however, and often produce settled pigment cakes which are hard and difficult to redisperse. The Baker-Patton Settling Gauge provides a means for measuring the volume and character of the settled cake. According to this test method (details upon request), MCP's organophilic ASP-403 imparts superior non-settling, easier redispersibility, non-agglomerating characteristics and viscosity stability to solvent thinned paints. The organophilic ASP's also wet-out and disperse better initially, and in so doing aid in dispersing many hard-to-grind pigments.

## Rubber Compounds

are improved with aluminum silicate pigments

Gum rubber compounds gain stiffness, tensile strength, and resistance to abrasion with the addition of suitable pigments such as carbon black ultrafine silica, and other mineral fillers.

Of the mineral fillers, MCP's aluminum silicate pigments (ASP's) are particularly

beneficial in certain extruded rubbers. They are water-washed and water-fractionated to free them of impurities, and thus have extremely low abrasiveness, good dielectric properties, and provide good surface uniformity.

These low-cost pigments also may be highly loaded and provide fast curing in other types of rubber. The high modulus and ease of processing has established the ASP's as favorites in wire insulation. They may better your products and cut your costs too... use the coupon for more information.

### MINERALS & CHEMICALS PHILIPP CORP.

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Materials Catalogue, pages 301-308

CORPORATION







## PEROXIDES IN CHEMISTRY



### Amine oxidation with "ALBONE" produces (Hydrogen Peroxide) new products for new applications

Amine oxidation with hydrogen peroxide is old textbook chemistry, but these classical reactions are starting to "pay off" anew in the chemical industry. An example is the growing interest in amine oxides for detergent, pharmaceutical and textile applications.

Aliphatic tertiary amines can be oxidized smoothly to the amine oxide by direct reaction with "Albone" hydrogen peroxide. Aromatic tertiary amines require reaction with a peracid prepared from hydrogen peroxide. These are some of the ways oxidation of nitrogen compounds is finding greater commercial potentiality with Du Pont's "Albone" hydrogen peroxide.

As a pioneer producer of hydrogen peroxide, Du Pont has developed many new and economical processes to help industry use hydrogen peroxide more profitably. For example, as part of this

continuing program, Du Pont makes available licenses to operate under U.S. Patents 2,910,504\* and 2,919,283, which are concerned with the preparation of peracetic acid and in situ epoxidation in the presence of cation exchange resins. These licenses may be obtained for one dollar upon written request to Du Pont.

Du Pont will be glad to share its years of experience to help you profitably use "Albone". If you'd like to discuss possible uses, call your Du Pont representative. He can supply you with more information and your personal copy of Du Pont's new 142-page book, "Hydrogen Peroxide in Organic Chemistry" (available in the United States and Canada only). E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Peroxygen Products Division, Wilmington 98, Delaware.

\*Basic patent issued to Du Pont, on peracetic acid-resin catalyst system.



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perborate tetrahydrate • SOLOZONE® sodium peroxide • Zinc peroxide • Calcium peroxide

## RESEARCH

tests will not be complete until spring.

In other reports, dodine was confirmed as an effective fungicide for reducing scab in pecans, and pentachloronitrobenzene was found to be effective against only certain strains of the fungus that causes cotton seedling disease (for which PCNB had once been considered the final answer).

## Pure Fused Quartz

General Electric has developed a new "ultrapure" fused quartz. Made from domestic raw materials via a new purifying process, the quartz will further decrease U.S. reliance on foreign sources of quartz. A Western Electric development (CW, Dec. 17, p. 99) was the first substantial move in this direction, since it developed a process for purifying low-grade quartz ore.

In an independent venture Bausch & Lomb, Inc. (Rochester, N.Y.), has just completed one of the largest quartz lenses ever built. Made of optical-grade quartz, it has a 35-in. diameter, is 6 in. thick at the center, weighs 350 lbs.

## LITERATURE

- Consultants Bureau Enterprises, Inc. (New York), now makes available three volumes of Russian research. A 212-page book, entitled "Soviet Research in Fluorine Chemistry, 1957-1958" is a sequel to a three-volume book on the same subject, which covers the years '49 to '56. "Soviet Research in Glass and Ceramics, 1957-1958" is the third collection of papers that CBE is producing, completing a 10-year survey of the field. And "Organic Chemical Crystallography" is a 550-page book in English, written by A. I. Kitaigorodskii.

- Plans for publishing the new "Journal of Catalysis" have been made by Academic Press (New York). Editors will be J. H. de Boer, Technological University of Delft (The Netherlands) and P. W. Selwood of Northwestern University (Chicago).

- Technical Aid Service, Inc. (Columbus, O.), reduces technical literature to simple digests of basic principles. A retrieval system is employed and subscribers are kept apprised of new developments as well as prior related developments.





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# ACRYLOID KM-228



## Tackling South America

**International Ore & Fertilizer Corp. (Interore) will make a major effort to establish itself in South America—a market it has heretofore considered (mainly because of strong competition) uneconomic for U.S. firms.**

Interore figures that the area represents too large a fertilizer potential to disregard. It estimates that the present use of fertilizers in South America is only 1% of the optimum rate.

Guests at Interore's second international trade seminar in New York last week were told that the firm intends to set up a string of sales offices covering most South American countries. At present, Interore has fertilizer sales offices in Brazil and Venezuela, will have one in Peru shortly, and will later establish offices in Colombia, Chile and Argentina, in that order.

The company expects to face up to a number of problems that have kept it from getting into the market in more than a minor way. They include heavy price and credit competition, increase of local manufacture, high U.S. shipping costs, and lack of credit insurance available to U.S. traders.

It feels that European producers—who can ship to South America more cheaply (because of lower shipping rates and loading costs)—can offer better terms, definitely have an edge. The company has found, however, that transporting in shipload quantities, storing product in large quantities near point of sale, is one way to keep costs competitive.

Interore has recently set up a traffic department, expects to get deeper into shipping, including ship ownership.

Similarly, a credit department has been set up to handle problems "that have become an accepted part of international trade." The company expects to be able to meet all competition on price and credit.

Aside from handling imported materials, Interore's offices are scheduled to become involved in local sales of domestically produced fertilizers. These sales will be added to give local offices stability on the market, aid them in establishing themselves. The company now has 25 sales offices (including domestic offices outside New

York), expects to have 35 by '64.

Interore is also expanding its operations in Asia. Right now this is the company's major marketing area, accounting for most of its 2.5-million-ton/year business (*CW*, June 3, p. 33).

The seminar was attended by about 150 people, including Interore employees, domestic fertilizer producers, and overseas fertilizer processors. They discussed local conditions, fertilizer technology and the new refined methods of international trade, with emphasis on shipping cost and credit problems.

## Eliminated from Safi

**Moroccan Information Minister Ahmed Alaoui says that his government has decided to withdraw its contract from Dorr-Oliver Inc. (Stamford, Conn.), to build a phosphoric acid plant at the Safi chemical complex. Reason, says Alaoui: Dorr-Oliver's "maneuvers and schemes" to obtain the whole \$50-million Safi complex contract (*CW*, Nov. 11, p. 25).**

The Minister's statement is the latest move in a stormy series of negotiations, charges and suits that have embroiled several international chemical construction firms deeply in Moroccan domestic politics. Behind most of the action: Morocco's opposition Labor party has made political hay out of some of the implications of graft in the government.

Istiqlal, the dominant political party, has stated that it would sue Dorr-Oliver over a report sent by Dorr-Oliver to the King. Istiqlal contends that this report alleged that there were irregularities (including a request for a kickback) in the government's awards of Safi contracts. Dorr-Oliver states that it did not accuse Istiqlal of seeking graft but simply said a German intermediary had requested money and that it submitted a factual report.

Further charges stemmed from a series of letters to the King from Dorr-Oliver Vice-President Douglas Reybold asking for clarification of the role of Blaw-Knox Co. (Buffalo,

N.Y.) in the project. Istiqlal says the letters slandered it. But Reybold insists that he simply sought more information on how to proceed with the project.

These letters led to the most recent charge against Dorr-Oliver. This concerns a letter sent by Reybold to the president of Blaw-Knox and described by Information Minister Alaoui as "attempted corruption at Morocco's expense." Blaw-Knox has been awarded a two-year contract to supervise prices, construction and operation of the Safi complex.

The letter expressed highest regard for Blaw-Knox and apologized "if any Dorr-Oliver personnel created an erroneous impression about Blaw-Knox's ability to perform engineering works." It added: "Unfortunately the Moroccan political environment is such that the high ethical standards to which American engineering firms try to adhere are not fully understood," and proposed that since Blaw-Knox and Dorr-Oliver would be working together in Morocco, their representatives there should get together for "frank and open talks." The Moroccans imply that this was an attempt on Dorr-Oliver's part to corrupt its watchguards.

The information Minister charges that Dorr-Oliver was previously eliminated from a Pakistan project for "similar dishonest means and unacceptable procedures." The company denies this, claims it has consistently enjoyed pleasant relations there.

Dorr-Oliver notes that the handling of Safi is still at issue in the trial. Until a decision is reached, they plan to content themselves with "setting the record straight regarding these false charges."

Moroccan officials state that with the assistance of Blaw-Knox, the construction cost for the project has already been reduced from \$33 million to \$25 million. Blaw-Knox officials say, however, that they've barely started, have not yet had a chance to save anyone any money.

The Moroccan government has made no final decision on a replacement for Dorr-Oliver, but officials indicate that the contract will go to Chemical Construction Corp. (New York) or Krebs & Co. of France, probably to the latter.



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## Needs

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**Isophorone**—standby for baked vinyl solution coatings; slowest evaporating of the line.

The table below lists viscosities measured on a Brookfield viscometer at 20 R.P.M. and 68°F., and relative evaporation rates (n-Butyl Acetate = 100) for these five ketones:

	Brookfield Viscosities of Lacquers at 68°F. (centipoises)		Relative Evapo- ration Rate
	Formula A	Formula B	
Acetone	94	88	1160
Methyl Ethyl Ketone	86	130	572
Methyl Isobutyl Ketone	230	360	165
Methyl Isoamyl Ketone	304	504	45
Isophorone	930	434	3

#### Formulas (Parts by weight)

	A	B
BAKELITE Vinyl Resin VYHH	20	20
Ketone	80	40
Xylene	—	20
Toluene	—	20
Total	100	100

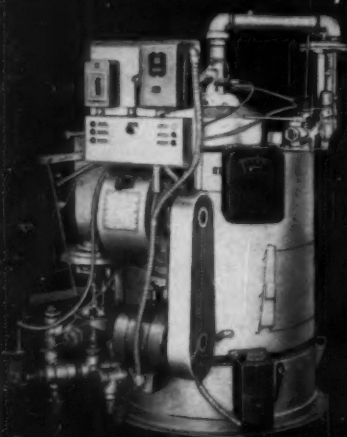
For complete information on ketones or other solvents, including esters, alcohols, and glycol-ethers, call your CARBIDE Technical Representative, or write: Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N.Y.

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## INTERNATIONAL

### WORLD WRAP-UP

**New Indian Project:** Great Lakes Carbon Corp. will participate in a new Indian company that will make calcined petroleum coke and calcined anthracite coal for the first time in that country. Other participants in the new India Carbon Ltd.: Birla Bros. and Himatsingka (a well-known West Bengal family of industrialists).

The plant, situated at Bauhati adjoining a new Indian government refinery, is scheduled to go onstream in Sept. '62. It will have an initial annual capacity of 36,000 tons of calcined petroleum coke and 6,000 tons of calcined anthracite coal.

Great Lakes' part of the \$1.7-million investment will be \$336,000—\$252,000 for equity—\$84,000 for technical know-how. Although—in accordance with Indian law against foreign domination—Great Lakes will not be the majority owner, it does have the biggest single share.

**Phenol/India:** Krebs & Co. of France has arranged with the West Bengal state government to be the consultant and engineer for a new plant to produce phenol (6,600 tons/year), phthalic anhydride (3,300 tons/year) and pentachlorophenol (990 tons/year). The plant will be located at Durhapur, will use by-products of a steel plant there.

**Management/U.K.:** Next chairman for Courtaulds Ltd. will be Sir Alan Wilson, now deputy chairman and managing director in charge of research and development. He will succeed Sir John Hanbury-Williams, who has been chairman since '46.

**Fertilizer/Chile:** Two technical experts will go to Chile, under the United Nations technical assistance program, to advise the government on the economic and technical feasibility of manufacturing phosphate fertilizers in that country.

**Management/International:** General Mills has set up a new international division, headed by W. F. Mitchell, vice-president and general manager of the company's chemical division. The new unit will coordinate the company's overseas activities and administer foreign subsidiaries such as Protex, S.A., Mexican producer of steroid intermediates for pharmaceuticals.

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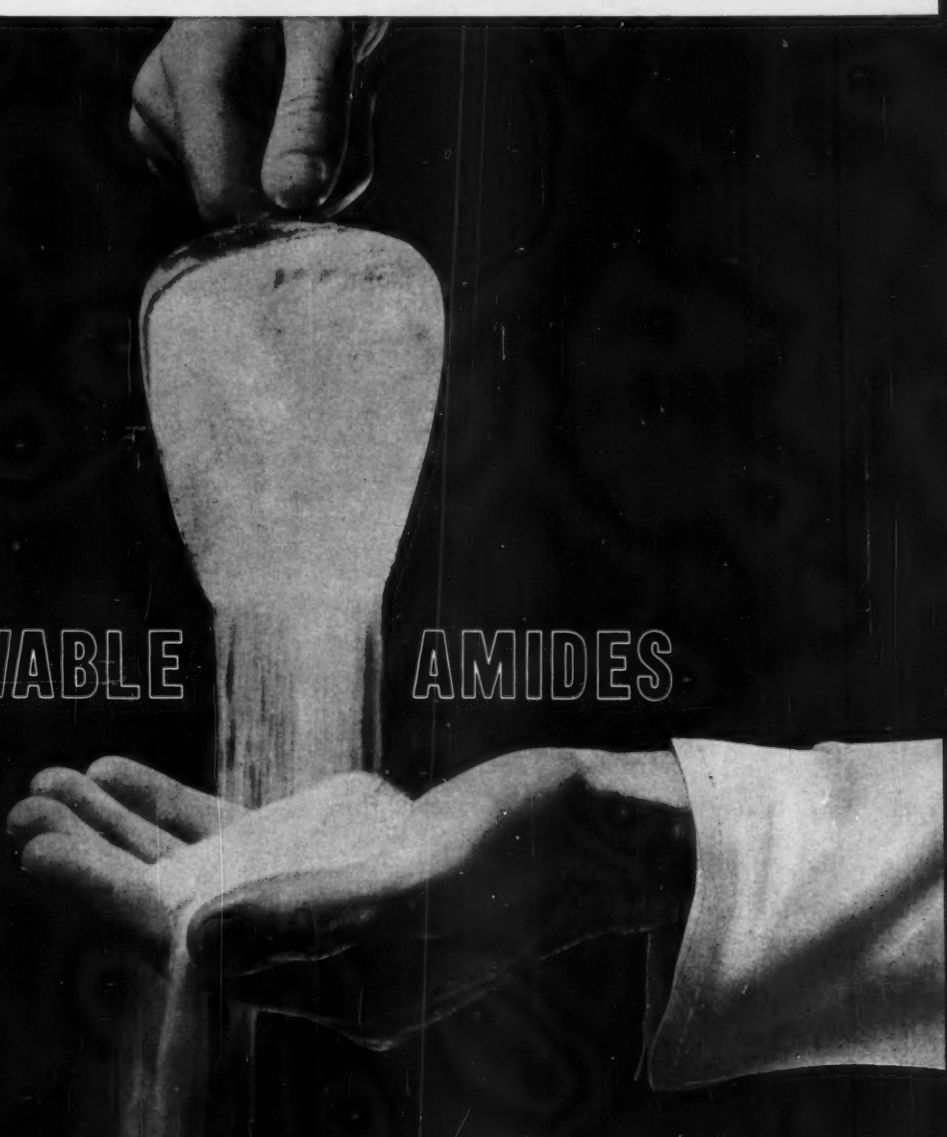
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# FLOWABLE AMIDES

## Lower production costs with flowable amides...

While it is known that oleamide provides polyethylene and polypropylene film with excellent slip and anti-block characteristics, the semi-solid, gum-like consistency of oleamide presents two serious production problems. First, the waxy gum is hard to remove from containers and second, distributing trace amounts of this solid uniformly on plastic flakes requires excessive mixing time. Working with its unique fatty acid processing and its unusually versatile amide facilities, HumKo produced an oleamide (KEMSTRENE

AMIDE U) that is a powder. Now HumKo has developed a dry, powdered, *fully flowable* amide (KEMSTRENE SU) to reduce further the production handling costs and to provide an even distribution of the amide throughout the flakes with minimum mixing time.

Perhaps these two new amides or others in this series can solve a problem for you (samples are available) ... perhaps a specially developed fatty amide is needed. Call or write for our technical service people to work with you.

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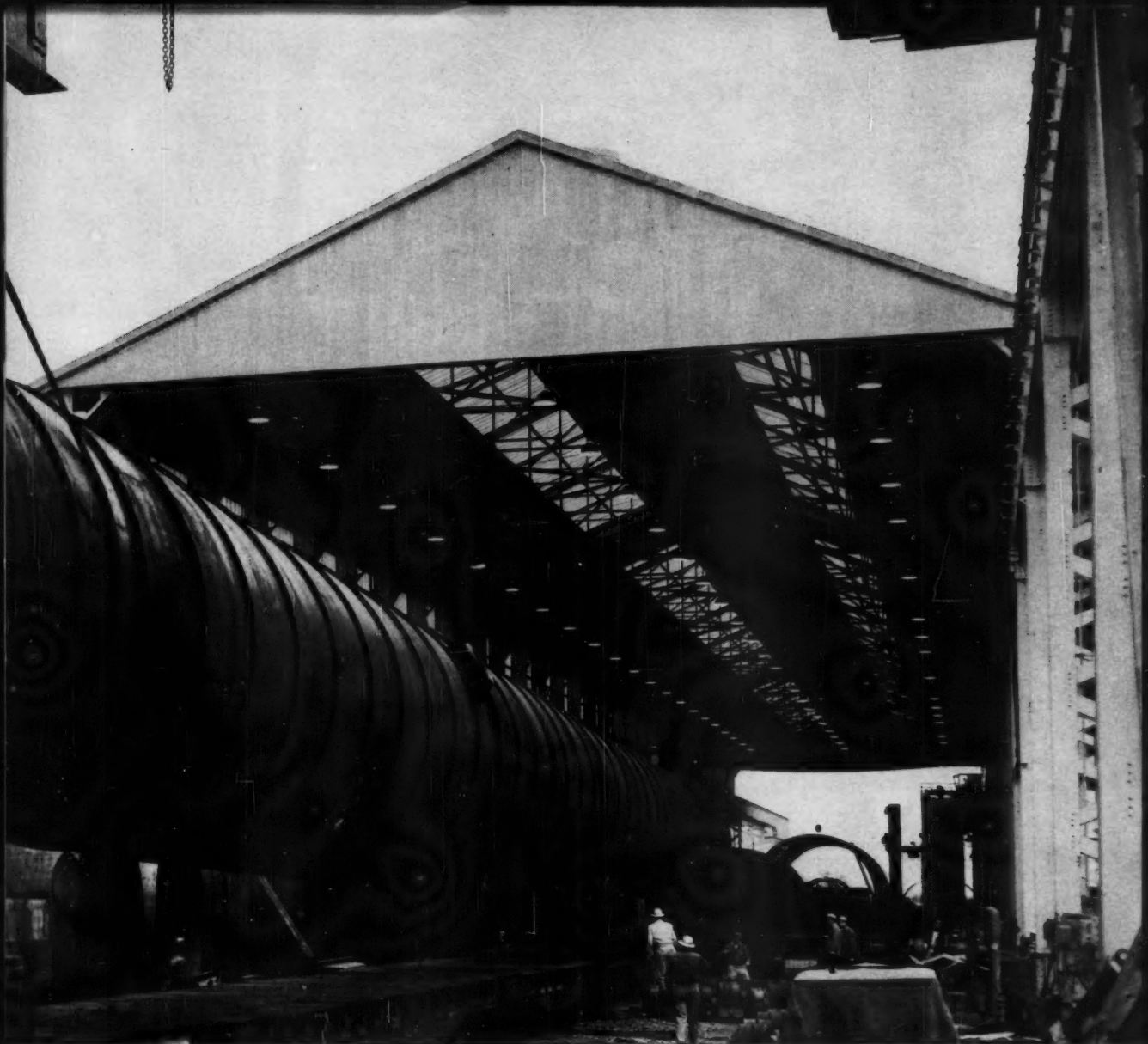
## This big fabrication is no tall story

It took six flat cars to ship this giant out of American Bridge's Orange, Texas, plate shop. Over 220' long and more than 12' in diameter, this tower is made from 33 steel rings, formed from  $1\frac{3}{16}$ -inch plates. High capacity boom-mounted electric welders joined the 33 rings, and special x-ray equipment checked the weld seams. □ What did we do for an encore? We fabricated three more towers, all about the same size—and weighing over 200 tons each. □ Badger Manufacturing Company, Engineers and Constructors, designed and erected the towers for a styrene manufacturing plant\* now under construction for Sinclair-Koppers Chemical Company. □ King-size, custom fabrication is routine at American Bridge's Orange plate shop. Staffed by experienced experts, completely equipped with modern fabricating facilities,



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# Market Newsletter

CHEMICAL WEEK  
December 16, 1961

**Dow Chemical again pigeonholed plans to raise polystyrene** prices. The firm officially notified its customers last week that a long-deferred price increase—due to go into effect Dec. 9—is canceled. Dow made a similar concession to consumer resistance in Jan. '61.

In both cases Dow and other producers who tried to boost polystyrene tabs based their moves on the same plea—the need to bolster financing of continuing research and development. But consumers balked, despite the suppliers' insistence that such R&D support would be to the "advantage of the ultimate consumer." This argument has been repeatedly voiced by Carl Setterstrom of Rexall—the firm that initiated the current price-hike attempt.

Dow's official stand, as stated by H. P. Morand, manager of plastics molding materials sales: "We are continuing to examine how the mutual idea—to maximize profits—can best be reconciled with your (the consumers') practical needs."

**Failure of the plans for price hikes** does not come as a surprise; it was generally believed that the increase would die outright or that off-and-on rescheduling of effective dates would drag on into '62 (*CW Market Newsletter*, Nov. 4).

When Dow withdrew, Monsanto promptly informed its customers that scheduled increases were canceled and that old prices would prevail. Rexall similarly retracted posted higher prices. Shell Chemical had quietly quit the game when effective dates were first postponed. Several other firms, including Koppers, Foster Grant and Brand Plastics, never participated.

Rexall's Setterstrom—like Morand of Dow—hasn't abandoned hope of an ultimate price increase. But Setterstrom's prediction that prices will go up "when supply and demand are in better balance" points directly to the real problem—oversupply—that scuttled the whole price-increase program.

**Polyvinyl chloride film prices will be raised 4%**, effective Jan. 1, by Pantasote Co. (Passaic, N.J.). In view of the polystyrene reversal, however, there is some doubt that the vinyl film price hike will stick.

But Pantasote may have a somewhat more convincing argument for a price increase than did polystyrene producers. The firm points out a recent ½¢/lb. price hike on vinyl chloride monomer (*CW Market Newsletter*, Oct. 7) as justification. A Pantasote spokesman also says that film prices in general have deteriorated badly during the past few years and that profits have been squeezed "below a safe level." He adds the company is not discriminating against any particular group of PVC film users, since the firm sells film to all types of users.



## Market Newsletter

(Continued)

Pantasote admits it is meeting light resistance among PVC film buyers who are still taking supplies at original prices. Pantasote seems to think users won't complain about the increase if it becomes industry-wide; but there doesn't seem to be much chance that Pantasote can hang on to higher price tabs alone.

**Even if the PVC film price boost also fails,** the attempt will not have been wholly in vain. At the very least, plastics producers have made it clear to customers that there is little hope for lower prices in the foreseeable future. Result: good expectations of price stability for a while.

•  
**Houston Chemical's new 80-million-lbs./year ethylene oxide** plant at Beaumont, Tex., is onstream. Much of the output will be used to make ethylene glycol antifreeze, which the firm sells under private label and in bulk on long-term contract to major oil companies.

•  
**Polypropylene tufted carpeting is making its commercial debut.** E. T. Barwick Mills (Chamblee, Ga.) is weaving the carpeting from polypropylene fiber supplied by Hercules Powder's new, 12-million-lbs./year fiber plant at Covington, Va., which went onstream recently (*CW Market Newsletter*, Sept. 30). Market hopes for the carpeting are pinned on claims of high performance and a \$7.95/sq.yd. selling price—well below quality wool carpeting.

•  
**U.S. fertilizer makers' fears that they might be cut out** of a big Korean contract (*CW*, Nov. 18, p. 37) have been dispelled. Interore, the export company that represented U.S. producers in the bidding, was last Friday awarded \$5.5 million of the \$6-million contract. Interore won the award on the original tender, Oct. 5, but International Cooperation Administration, major influence in the matter, decided there should be a retendering. It proposed to (1) to set a maximum acceptable price and (2) to ask bids on an unrestricted worldwide basis. (In the original tender, 17 highly industrialized nations were excluded.) Last week's award indicates that Korea has reverted to its original plan. It is an important victory for Interore (see p. 110).

•  
**U.S. pesticide sales hit a record \$300 million in '61** (basic manufacturers' level), according to a year-end report by National Agricultural Chemicals Assn.

Insecticide sales were up about 7% (first major increase in two years.) Herbicides—on the rise for several years—were up again.

A reshaping of pesticide markets seems to be taking place. Usually about 60% of the industry's total output is for agricultural uses, 20% each for non-ag and export markets. But non-ag (home and garden) sales amounted to \$50 million in '61—less than 17% of the total. Value of exported pesticides is expected to go over \$116 million or almost 39% of the total sales value.





The challenge stirs the imagination and ingenuity of man perhaps more than any other in history. And in the drive to conquer the almost unthinkable infinitude of the heavens, Georgia Tech scientists joined the task early and have kept pace with space technology and developments. Notable achievements have been made in ceramics for rocket nose cones and work is being pressed forward in developing protective coatings for space ships re-entering earth's atmosphere with the speed of a shooting star. Heat-fighting nozzles are being created for uncooled solid propellant rockets. Another project may contribute to a nuclear propulsion system. Georgia

## SPACE

Tech scientists have also tackled the job of finding a flexible ceramic for insulating the electrical systems in missiles and aircraft. Few earth materials have been exposed to the strange environment of space. Research at Georgia Tech will tell us which materials will stand the test before they are sent on a journey to the stars. We are proud of Georgia Tech's contributions. GASA will draw heavily on the school's resources in helping make America's space program a success. Your inquiry for information on this resource in research will be held in strict confidence.

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Executive Offices, State Capitol, Atlanta, Georgia



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when you buy  
from Eastman!





# Half-a-million pounds of cellulose acetate butyrate for Salesman 312

"Whether he knew it or not, the customer needed a supply of cellulose acetate butyrate," reported one of our Eastern region salesmen, "so I was on the phone again to tell him (this was the third time).

"I had just received an urgent teletype from our plant which read:

AT CURRENT PRODUCTION RATE ASSIGNED WAREHOUSE SPACE WILL BE FULL OF SPECIAL TYPE BUTYRATE ESTER DAY AFTER TOMORROW. PLEASE ADVISE DISPOSITION AND IF WE SHOULD CONTINUE PRODUCTION.

"The problem was that in July we had received no orders from this customer for August delivery. Yet, he normally used several hundred thousand pounds per month of this particular ester. On the first check I had been advised by their Purchasing Department (my regular contact being on vacation) that they were sure everything was quite in order.

"But then three weeks went by, three weeks of grinding out the ester and stacking it against my insistence that the customer somehow was wrong and would surely need it.

"The chemical buyer returned; I checked the second time; he checked with his warehouse people and reported that apparently they had enough, production was normal. More esterification, two weeks more with no orders, and I could see my name stenciled across 9,862 bags of ester.

"With this third call I fully expected some words of advice about attending to my own business, which I was. But patience and a detailed outline to the customer of his normal purchase pattern paid off. For an actual count inventory revealed that it was dangerously low.

"Following a few parting remarks from the chemical buyer about our keep-track-of-his-inventory type service, I notified the plant to start shipments immediately."

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### **Cellulose Acetate Butyrate**

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### **Oxidized Cellulose**

*For absorbable surgical gauze.*

For properties and shipping information on these and other Eastman products, see *Chemical Materials Catalog*, page 225, or *Chemical Week Buyer's Guide*, page 113.

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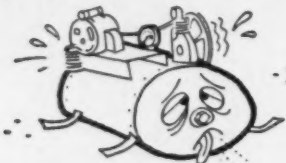


ONE OF A SERIES OF CHATS ABOUT THE  
CONSERVATION AND CONTROL OF HEAT

# SARCO TOPICS

## PREVENTION OF CRUELTY TO OLD COMPRESSORS

You've got at least one air compressor, of course. Doesn't everybody? And there it sits, pumping its heart out for you year in and year out. And you there, Simon Legree, do you ever give it a break and measure its capacity? One measure is the useful work done by your compressed air tools, of course. However, this yard stick may make your compressor installation seem way oversize, but don't blame the equipment. The puffing oldster isn't responsible for choked intake filters, poorly designed suction pipes,



overcooling, undercooling, inadequate distribution mains and wet air. All these things can cost you.

Off and on we're going to talk about compressors in these pages, if you don't mind. It's a big subject and the lesson for today will be confined to the air intake. Can you imagine a more logical place to start?

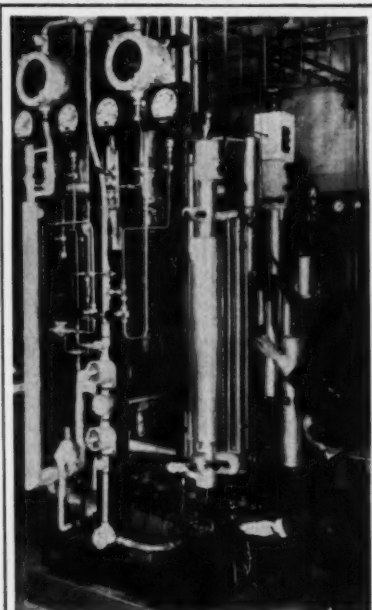
Where to locate the intake? Easy. Where the atmosphere is clean and cool and dry. Dirty air and grit choke filters and eventually get through to cause wear. The cooler the air, the more you can compress per revolution. You'll get 10% more air delivered at 40°F. than at 90°F. And dryness is imperative, because compressed air can't contain all the moisture it can hold in its uncompressed state. Where does the moisture go? Into mains, tools, and valves, unless it's removed. And need we add that chemical fumes cause corrosion? That includes exhaust gases from engines and furnaces. CO<sub>2</sub> in the presence of oxygen and moisture can rust your valves, tools, nozzles and sprays.

How about intake size? Keep pipes short, sized right, and straight as possible. Small pipes with snaky bends reduce pressure and capacity. For an educated example, a pressure loss due to friction in the intake pipe and filter of 2 psi (14.7 to 12.7) will reduce output of a 125 psi compressor by 7.5%. How do we know so much? Well, as we continue in future issues, we'll be talking drains and traps and cooling and safety controls for compressors—all of which we manufacture. That's how we know so much. If you can't bear to wait, just write. It's that easy to get information out of us.

## SARCO AND THE FLYING DUTCHMAN

In the pipe shop of a major office building complex on New York's east side, the Flying Dutchman flies again. This is really a bright idea which could well become standard practice elsewhere, because it's the kind of logical precaution that would make sense anywhere.

The chap in our photograph is putting together, according to precise, dimensioned drawings, an assembly consisting of a Sarco Thermo-Dynamic Steam Trap, Type TD-50, a Sarco strainer, and valves and fittings for stock. The assemblies will be used for quick and easy replacement in the event of failure or any possible maintenance requirement in the steam distribution system, the heating system, or the air conditioning system.



### WORLD'S LARGEST ESPRESSO MACHINE?

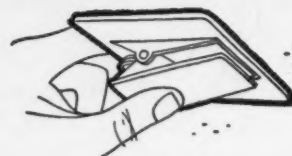
No indeed. It's a pilot plant Hydrofiner unit built by The Lummus Company at its Engineering Development Center in Newark, New Jersey. And its presence here is due to the fifteen ½" Sarco Thermo-Dynamic Steam Traps which vent and drain its 35 pound tracer lines plus a ½" TD-50 as a main drip. Nice to be picked for projects like this. Makes us proud.



We'd like to be able to report that this plan recently saved thousands of people from freezing or roasting during a crisis. So far, however, the assemblies have proved to be an ornamental kind of insurance policy. Alas, there have been no failures. That dog-goned Sarco performance is just too reliable for its own good.

## WE'VE GOT THINGS TO GIVE AWAY

First of all, we have a new spring clip to hold together a bunch of papers on your desk, or something. It's not complicated, but it is difficult to describe, so we've gone to the tremendous expense of having our local Michaelangelo sketch it here. If you have no papers to hold together, it makes a rather delightful snapping noise that might amuse you. Oh yes—it also has a cross section of a TD-50 steam trap printed on it which actually moves when you wiggle your eyeballs at it. In case you still don't know how a TD-50 works, this is for you.



Second, we've still got engineers' sketch pads which we enjoy giving away so much we're offering them again. In case you're new here (Hello!) they contain isometric grid paper for use by anyone involved in piping or hookup sketches for process or heating applications.

And the famous Sarco key chain, which is really exactly that—a chain—about 60 times as handy as a fat case, we're offering again too. This has a TD-50 replica attached, but detachable. Call it tawdry promotion if you will, but our super-aesthetic wife wears one proudly around her neck.

All of these are available from your Sarco representative. Or, if he's out, write in.

*There's really no reason to keep this conversation one-sided. After all, we're both interested in these subjects or you wouldn't have read this far. So write, even if it's only about a difficult problem.*

7826

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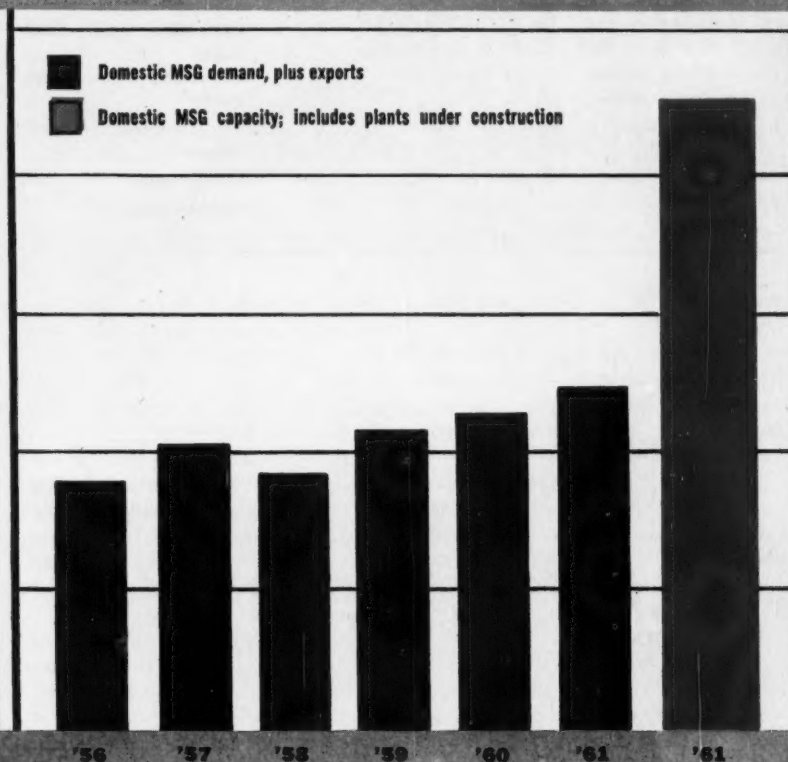
**SARCO**



## MARKETS

### Monosodium Glutamate Capacity Outpaces Demand

Million/pounds/year



Sources: U.S. Tariff Commission; CW estimates.



Soups and other processed foods will provide major outlets for flavor-enhancing MSG.

## Flavor Market Fattens MSG Capacity

Monosodium glutamate capacity—already far outpacing demand—shows new signs of continuing to climb fast. But there's a chance that a too severe overcapacity problem may be averted: all the new capacity for this flavor-enhancing chemical is based on lower-cost fermentation processes, and some of it may replace—rather than augment—older, conventional extraction plants.

Newest candidate for increasing MSG capacity is Hercules Powder Co. The firm tells *CHEMICAL WEEK* it is considering expansion of present extraction-based MSG production at its Huron Milling Division (Harbor Beach, Mich.), which has an output potential of about 5 million lbs./year. Hercules says the expansion would utilize a new low-cost fermentation process resulting from more than three years' research by the company.

Wheat starch, now commercially produced at Harbor Beach, would be the basic raw material. The method reportedly is the first of its kind developed by a U.S. company and utilizes a new microorganism isolated by Hercules researchers. The new process will yield high-quality MSG "at prices competitive with all types of MSG now reaching the market from domestic or foreign suppliers," the company states.

Also this week, International Minerals & Chemical Corp. (Chicago), now using an extraction process, revealed that its MSG fermentation process (now in pilot stage) has shifted into final phases of development. Industry observers say it's a good bet that IMC will soon have the new process producing commercially.

Chas. Pfizer & Co. recently placed a new, 5-million-lbs./year fermenta-

tion unit in operation at Groton, Conn. (*CW Market Newsletter*, Nov. 25). And Commercial Solvents will bring 4-5-million-lbs./year fermentation plant onstream by mid-'62 at Terre Haute, Ind.

**Capacity Countdown:** Domestic capacity currently totals about 41 million lbs./year. When Commercial Solvents starts up its plant, capacity will rise to more than 45 million lbs./year. But demand, including exports, will reach 24 million lbs. in '61, climb to only 30 million lbs./year by '65.

What's behind the capacity buildup? The sudden flurry of interest in MSG is presumably linked to its potentially high profitability, even though prices are said to have softened considerably in the past few months. During '59, '60 and early '61, prices held firm. Right now, the chemical lists at about 92¢/lb., but carload quantities are re-



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## MARKETS

### Monosodium Glutamate Producers

Company	Location	Capacity*	Process
Commercial Solvents	Terre Haute, Ind.	4**	Fermentation
Great Western Sugar	Johnstown, Colo.	5	Extraction from beet sugar
Huron Milling Division, Hercules Powder	Harbor Beach, Mich.	5	Extraction from wheat gluten
International Minerals & Chemical	San Jose, Calif.	14	Extraction from Steffens filtrate
Merck & Co.	Danville, Pa.	12	Fermentation
Pfizer	Groton, Conn.	5	Fermentation

\*Capacities (million pounds/year) are CW estimates. \*\*CSC plant should be onstream by mid-'62.

portedly moving at 85¢/lb. and even lower.

Despite price softening, market observers say the business still offers profits, point to the economic edge offered by fermentation processing over the extraction techniques.

It could well be that new fermentation capacity will replace the older extraction methods if now-prevalent price shading becomes more pronounced. Says one producer, "An MSG price war is going full tilt right now and it will get worse."

Meanwhile, market demand for this flavor extender should continue to climb rapidly during the next five years, reach the 30-million-lbs./level by '65 — 8.6-million-lbs./year more than '60's 21 million lbs. Although the total poundage seems small, it's big business at current prices.

**Measuring the Market:** The MSG market divides into four major segments: industrial (or food processing), consumer, institutional, exports.

Food processing, which took about 14 million lbs. of MSG in '60, is by far the largest segment and is expected to register the biggest gains during the immediate future. Products in this category include soups (both canned and dehydrated), meats, frozen foods, baby foods, condiments, sauces.

Dehydrated soups, frozen foods, and condiments and sauces extend the brightest hope to MSG in industrial markets. Dehydrated soups consumed about 1.5 million lbs. in '60 and will take about 3.5 million lbs. by '65. By that time, frozen foods' requirements for MSG will double, to about 4 million lbs./year, and condiments and sauces will probably take about 2.5 million lbs.

Last year hospitals, hotels, country clubs and the other institutional users took about 3 million lbs. of MSG.

These institutional buyers have developed a growing dependence upon this chemical to enhance the flavor of foods at little cost. That market will likely expand to about 5 million lbs./year by '65.

The retail market for MSG is surprisingly small. In '60 about 2 million lbs. moved through retail channels, with International Minerals & Chemical's Ac'cent commanding more than 95% of the total. By '65 at least 2.5 million lbs. will be retailed.

**Reasonable Balance?** Right now the trend in this country is definitely toward fermentation as the favored MSG production route. Fermentation's cost advantages will exert a strong appeal.

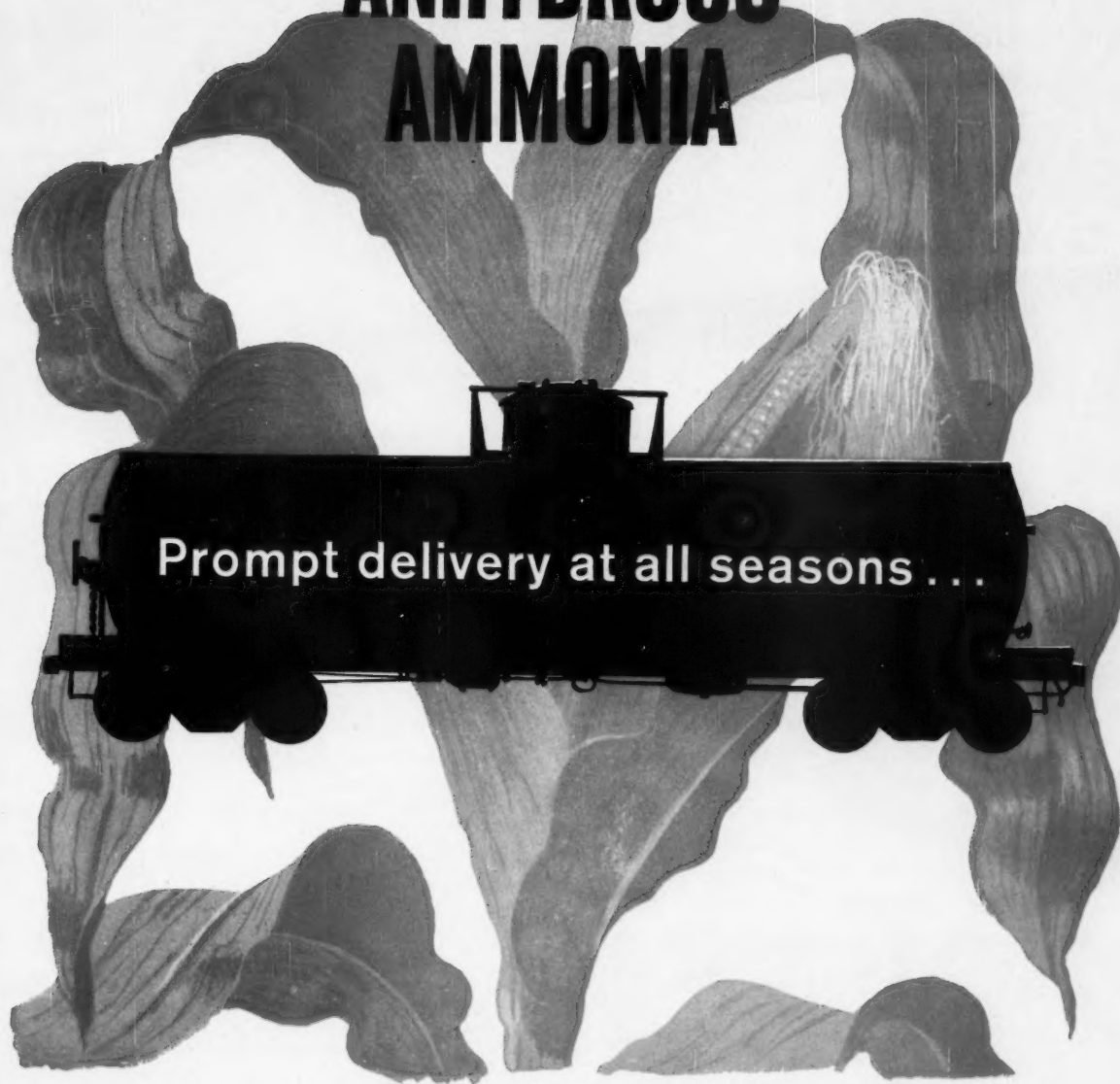
If MSG production capacity based on extraction methods is replaced, rather than augmented, by new fermentation capacity, MSG will find itself in a reasonable supply-demand balance. This would stabilize both market and price in the future. But meanwhile producers can expect plenty of vigorous competition.

### MSG Uses

	Million pounds/year	
	'60	'65
<b>FOOD PROCESSING</b>		
<b>Soups</b>		
Canned soups	6.5	7.0
Dehydrated soups	1.5	3.5
<b>Meats</b>	1.5	2.0
<b>Frozen foods</b>	2.0	4.0
<b>Baby foods</b>	0.5	0.75
<b>Condiments, sauces</b>	1.0	2.5
<b>Other inc. exports</b>	3.5	3.75
<b>Totals</b>	16.5	23.5
<b>CONSUMER</b>	2.0	2.5
<b>INSTITUTIONAL</b>	3.0	5.0
<b>Grand totals</b>	21.5	31.0



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## Cost of one-dimensional criticality computations drops from an average of \$75.00 to \$7.50 per problem

Faster computing, less travel time are the reasons why General Nuclear Engineering Corporation has realized such cost savings since it installed an IBM 1620 Data Processing System at its Dunedin, Florida plant.

Since its main computing facilities are not located at Dunedin, General Nuclear has found that the new 1620 eliminates much of the travel time and expense involved in taking problems to off-site computers. In addition, the 1620 performs the simpler criticality computations 10 times faster than the computer previously used at one of General Nuclear's off-site data processing centers.

General Nuclear uses its new 1620 for other problems, too...heat transfer calculations, various transient codes, mathematical routines for the physics and engineering departments, multi-group calculations, and many other jobs you might expect only a much more expensive computer to be able to handle.

This isn't all. General Nuclear uses the 1620 to do statistical analyses and variance calculations on input data for programs run on off-site large-scale IBM computers.

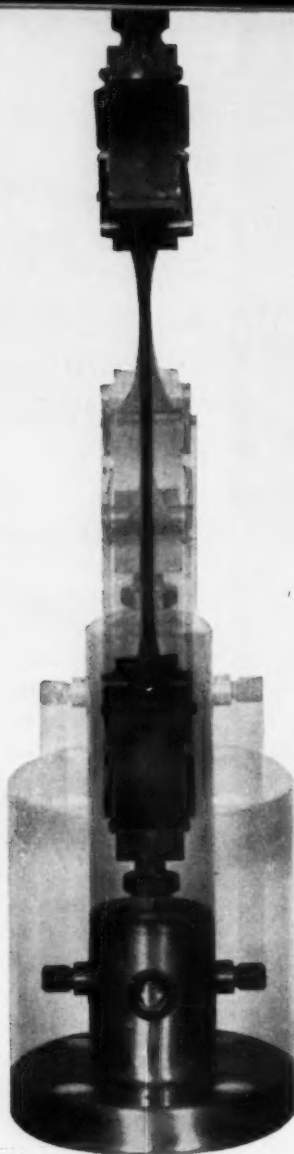
For information on this highly versatile, low-cost data processing system, which rents for as little as \$1600 a month, contact your local IBM Representative.



Easy to program. FORTRAN, IBM's scientific computer language is available for the 1620. General Nuclear scientists use a special scientific interpretive program—FIDO—written by the Manager of their Computing Section.

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## Answering the Cry for Technical Speakers



Speech expert Karl Moll advises Esso researchers.

Esso Research and Engineering's (Linden, N.J.) technical speakers bureau — a pool of 80 staffers—was launched last week. This, and similar new programs at other companies, is management's response to a growing demand for technical speakers by schools, professional groups, civic and fraternal organizations, etc.

Hercules Powder, deluged with requests for talks on chemical propulsion, is now setting up a speakers bureau. (In Wilmington, Del., one night last week, four Hercules' speakers lectured on propulsion, at four different meetings). Humble Oil & Refining Co. is in the process of establishing bureaus at various locations. And bureaus at American Oil Co. (Whiting, Ind.) and General Electric's Schenectady, N.Y., and Pittsfield, Mass., plants are thriving.

**Tips to Talkers:** Esso Research has retained Karl Moll, assistant professor of speech at New Jersey's Montclair State College, to instruct its speakers group.

Humble pays for speech courses, which personnel may take on company time or at night school. Hercules has retained Wilmington speech consultant Francis X. Gallagher full time to coach its executives. GE offers a self-propagating course (graduates serve as instructors), called "Effective Presentation," to its employees.

Speakers also get assistance at companies that do not have formal bureaus. Du Pont has no pool of tech-

nical speakers, although its extension division does furnish executives who talk to civic groups, etc. The company encourages researchers to participate in technical meetings, provides help via its Public Relations Dept.

Standard Oil of California gives a 10-week public speaking course available to all departments of the company. Technical people have been quick to take advantage of this opportunity. Nearly 30% of the graduates in the home-office city of San Francisco are from California Research Corp., Standard of California's research arm.

Four years ago, when the course started, employees were giving a total of 400 speeches/year. Now they deliver 700/year, before a combined audience of 50,000-75,000.

Standard of California's course is given by top-flight teachers, including L. T. Chapin, professor of speech at Stanford University; Norman Free-stone, head of the department of English and speech at Occidental College; and Dominic LaRusso, professor of speech at the University of Washington.

Allied Chemical has no speakers training program (but offers an instructive booklet and also helps in setting up exhibits). Allied personnel give 400-500 talks/year, of which 300-350 are presented by researchers.

The growing demand for technical speakers presents not only a challenge

but also an opportunity for publicizing a company's activities and achievements—enhancing the image to aid in recruiting and building stature for products. Esso Research's new bureau was deemed necessary to stress (particularly to colleges) the firm's basic research.

But the promotional value of these presentations, Esso Research reasons, while real, is necessarily subtle. For example, it considers brandnames pertinent in technical talks only in special cases. Other companies share this viewpoint.

Nevertheless, some industry observers are alarmed at what they believe to be a trend toward use of technical meetings for overtly promotional purposes. They decry "trying to sell" at meetings intended for "dissemination of information."

**Building the Image:** General Electric's speakers' bureau in Schenectady is several decades old and offers talent in many fields (sales, purchasing, engineering, research) instead of concentrating on technical subjects. Esso Research has also had a general speakers bureau in operation for a number of years.

But the surging importance of research as a corporate activity and a concomitant rise in public interest in technical matters have helped boom the popularity of purely technical talks. By training technical staffers to speak effectively, management is taking steps to prevent the boom from misfiring.



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## ADMINISTRATION

### LABOR

**Stalemate:** Contract negotiations have been put off at Standard Ultramarine and Color Co. (Huntington, W.Va.), which has been struck by 408 union members of Local 10-180, Oil, Chemical & Atomic Workers, since Nov. 10.

A company spokesman says "management rights" are the major area of dispute. "In recent years, we have been hampered by certain labor contract provisions that have resulted in inefficient utilization of both manpower and equipment," he adds. "The importance of correcting this situation has been pointed out to the union negotiating committee, stressing the need . . . to offset lower profit margins."

Union spokesmen claim that seniority and wages are the basic points of contention.

**New Contracts:** Samuel Greenfield Co. (Buffalo, N.Y.) and Mine, Mill & Smelter Workers Local 537 have agreed on a new contract ending a 120-day strike. Provisions: improved life insurance, hospital and surgical plans. Expiration date July 31, '62.

• At Niagara Falls, N.Y., Good-year Tire and Rubber Co. and Local 15-277, Oil, Chemical & Atomic Workers, have a new contract providing a 7¢/hour wage increase to 217 hourly employees. Effective date May 20, '62. Expiration date Nov. 20, '63.

• Pittsburgh Plate Glass Co. (South Charleston, W.Va.) and Local 12141, United Mine Workers of America, District 50, have agreed on a two-year contract covering about 185 hourly maintenance and production workers. Terms: an immediate 8¢/hour raise and a 7¢/hour raise next November. Included: fringe benefits, improvements on vacations, seniority, overtime, pension adjustments, etc.

**New Union District:** Charleston, W.Va., has become an 11-state-district headquarters for Oil, Chemical & Atomic Workers International Union, AFL-CIO. The new District 3, formed when OCAW voted to reduce its districts from 16 to nine, includes Florida, Georgia, Alabama, Mississippi, South Carolina, North Carolina, Tennessee, Kentucky, Virginia, West Virginia and the southern tip of Ohio.

**Union Under Fire:** Three discharged employees of Durez Plastics Division of Hooker Chemical Corp. (North Tonawanda, N.Y.) are suing International Assn. of Machinists and the president of Local Lodge 2112 for \$250,000, charging the union encouraged them to strike by falsely stating they would not be penalized. The employees say they were fired on Nov. 4, '60 after participation in a strike and that Clinton Benware, Local 2112 president, refused to start proceedings on their behalf and would not call a special local meeting on the matter, although more than the required 100 signatures were on a petition.

### Canadian Combine

**A new association of Canadian chemical manufacturers is being formed, but Canadian memberships in the Manufacturing Chemists' Assn. are not likely to dwindle.**

Robinson Ord., president of Canadian Chemical Co. Ltd., is chairman of the founding committee of the new organization. Other committee members: P. C. Allen, president of Canadian Industries Ltd.; H. L. Blasford, president of H. L. Blasford Ltd.; A. A. Cummings, president, Union Carbide Canada Ltd.; H. H. Lank, president, Du Pont of Canada Ltd.; L. D. Smithers, president and general manager, Dow Chemical of Canada Ltd.; and H. S. Sutherland, president, Shawinigan Chemicals Ltd.

Formation of the group was proposed by a consulting firm retained to assess need for a new association.

Ord says that a petition for a corporation will soon be filed in Ottawa, after which invitations will be sent to prospective members. Eligibility will extend to any company, or division of a company, primarily engaged in chemical manufacturing, that sells to others a substantial portion of its output.

Canadian chemical producers that hold MCA membership usually do so because of close ties with U.S. firms. This isn't likely to change, in MCA's opinion. However, MCA has many activities that concern only U.S. members (e.g., food and drug laws). So the new Canadian association (which will have a full-time staff) is expected to provide a needed forum on domestic matters.



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# Chemical Week

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R. J. Clausen, 645 N. Michigan Ave., MOhawk  
4-5800

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1-7000

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Denver 2 ..... J. Patten  
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3615 Olive St., COntinental Bldg., JEfferson 5-4867

San Francisco 11 ..... William C. Woolsten  
255 California St., DOuglas 2-4600



## ADMINISTRATION

### KEY CHANGES

**Byron H. Larabee** to vice-president, Firestone Tire & Rubber Co. (Akron).

**Nolan B. Sommer** and **Alfred L. Peiker** to vice-presidents, Cyanamid European Research Institute, Inc. (Geneva, Switzerland), subsidiary of American Cyanamid Co.

**Charles C. Brewer** to Baton Rouge plant manager, Chemical Division, Foster Grant Co., Inc.

**Kenneth Newman** to manager, Nuclear Division, Turco Products, Inc.

**Joseph T. Lewis** and **Fred L. Willis** to vice-presidents, Toni Division (Chicago), The Gillette Co.

**Roscoe C. Wilson** to president and the board of directors; **Frederick L. Anderson**, **Paul V. Cusick**, **Henry W. Harding**, **Wm. Barclay Harding**, **Donald L. Lucas**, **Donald L. Putt** and **Milo Vesel** to the board of directors, Allied Research Associates, Inc. (Boston).

**Walter J. Dugan** to manager of marketing, chemical materials department, General Electric Co. (Pittsfield, Mass.).

**Harrison C. Stackpole** to president, **George E. Ritter** to executive vice-president, **Benn F. Goodrich** to secretary, Stackpole Carbon Co. (St. Marys, Pa.).

**Joseph Muckley** to vice-president, Martin Marietta Corp. (New York).

**C. C. Schulze** to vice-president and group executive, The Chemical Group, General Aniline & Film Corp. (New York).

**Lewis C. Kleinhans** to president and chief executive officer, Drew Chemical Corp. (New York).

**Willard B. Ferguson** to treasurer, Research and Control Instruments, Inc. (Woburn, Mass.).

**Charles D. Signorelli** to controller, Tidewater Oil Co. (New York). **J. E. O'Brien** to the board of directors, W. P. Fuller & Co. (San Francisco).

**Bryce Maxwell** to the board of directors, U. S. Rubber Reclaiming Co., Inc. (Buffalo, N.Y.).

**H. Gordon Fromm** to vice-president, Sun Chemical Corp. (New York).

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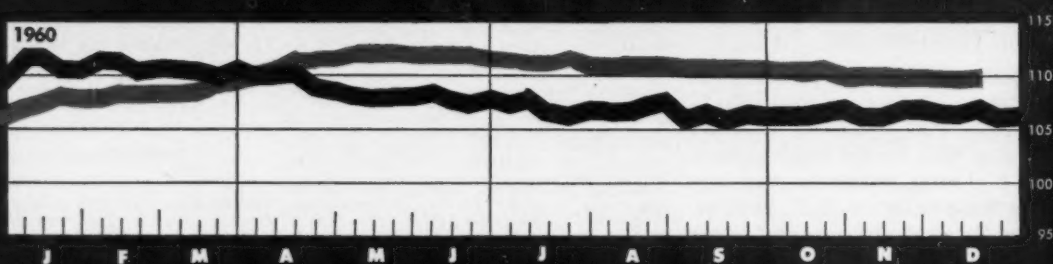
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OUTPUT INDEX



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DECEMBER 16, 1961

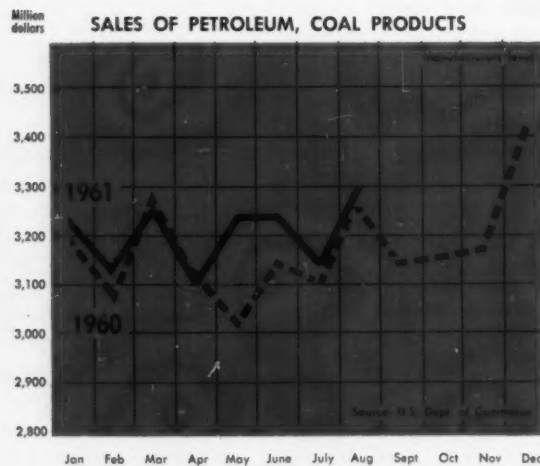
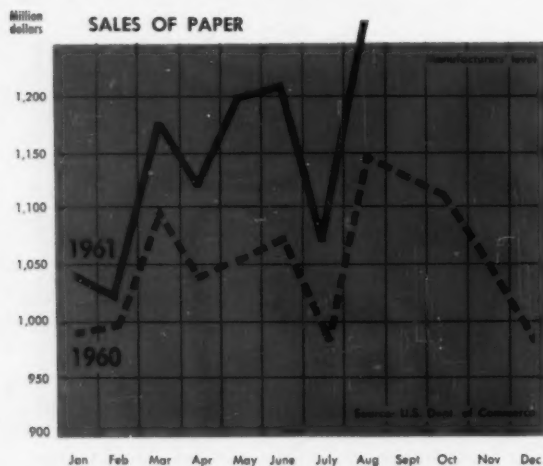
WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1950=100)	128.6	128.3	124.5
Chemical Week wholesale price index (1947=100)	109.3	109.2	107.4
Stock price index (12 firms, Standard & Poor's)	54.17	54.95	46.08
Steel ingot output (thousand tons)	2,073	2,032	1,393
Electric power (million kilowatt-hours)	15,954	15,330	14,773
Crude oil and condensate (daily av., thousand bbls.)	7,209	7,210	6,964

FOREIGN TRADE INDICATORS  
(Million dollars)

	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
<b>EXPORTS</b>				<b>IMPORTS</b>		
Chemicals, total	139.3	141.9	141.8	31.1	28.7	28.1
Coal-tar products	15.5	16.0	15.2	7.3	6.5	4.4
Industrial chemicals	23.2	25.6	24.9	9.1	8.3	8.8
Medicinals and pharmaceuticals	22.7	22.1	21.4	3.0	3.3	1.7
Fertilizers and materials	9.6	8.6	12.0	8.6	7.2	10.2
Vegetable oils and fat (inedible)	4.9	8.4	3.5	6.5	7.3	7.3

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Assay .....	99.5%
Insoluble .....	0.007%
Residue after ignition...	0.01%
Chloride (Cl) .....	0.0005%
Phosphate (PO <sub>4</sub> ) .....	0.001%
Arsenic (As) .....	0.00002%
Heavy Metals (as Pb)...	0.0002%
Iron (Fe) .....	0.001%

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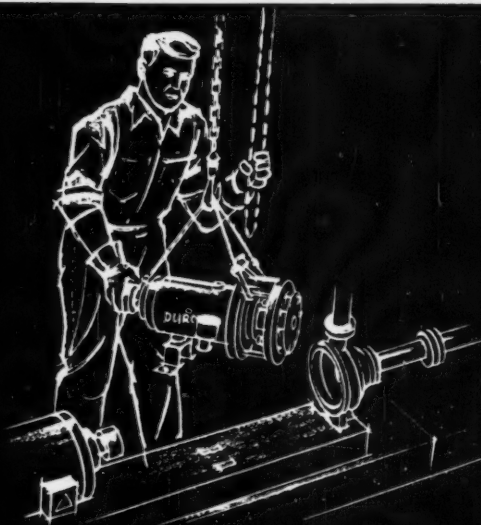
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ance? Durco leads in the development and manufacture of corrosion resistant alloys. Castings are designed for optimum corrosion resistance and hydraulic efficiency and are produced in our own foundry to assure complete quality control from raw material to finished pump.

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